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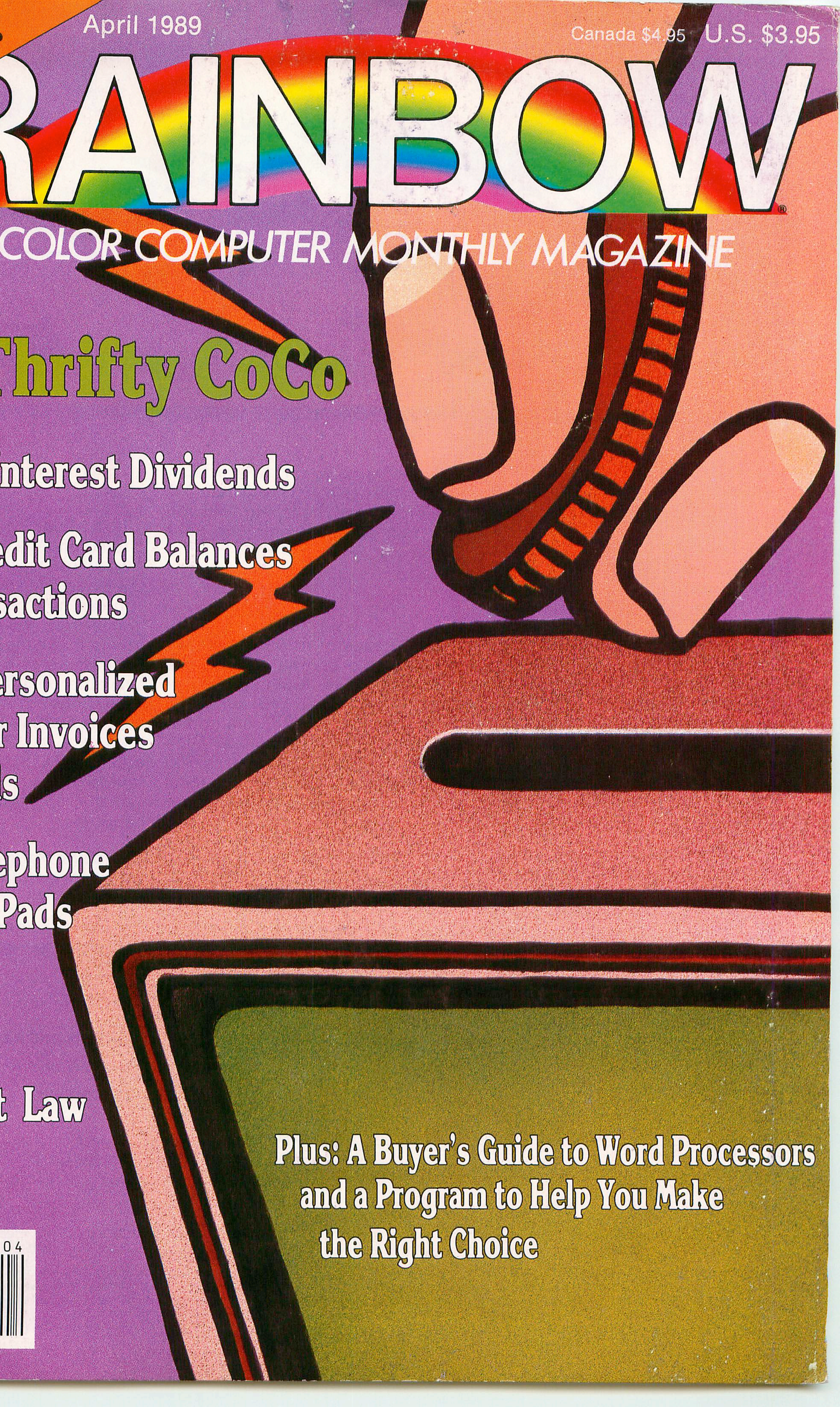

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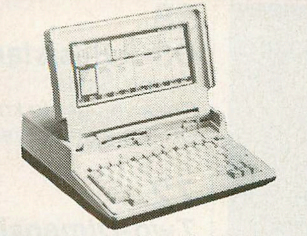
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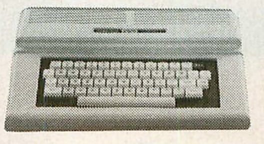
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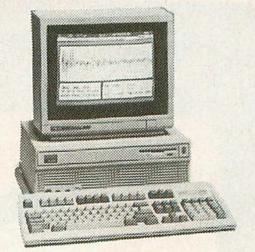
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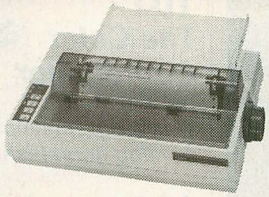
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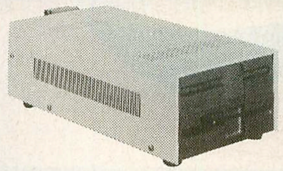
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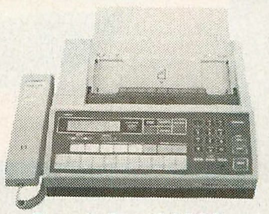
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Letters to the RAINBOW

BACK TALK

Editor:

Your editorial in the March 1988 issue of RAINBOW was intended to reassure the CoCo Community that the CoCo is alive and well. You pointed out that the CoCo is Tandy's hottest selling item and has outsold all other products for several years. Apparently Radio Shack business people here in Canada do not read your editorial with the same enthusiasm.

Two weeks prior to Christmas, Radio Shack stores in the Toronto area had a clearance sale of CoCo hardware and software. CoCo 3s were sold for $95 and software at ridiculously low prices as well. Customers have been informed that items will not be restocked.

My son is left with a CoCo 3 from Christmas with no place to purchase a CM-8 monitor. Please offer me some reassurance that there is still hope for the CoCo.

John W. Ivory
Scarborough, Ontario

See Lonnie Falk's "Print #-2," on Page 10 of this issue.

What's All the Excitement About?

Editor:

I want to comment on Richard White's OS-9 memory discussion in the January 1988 issue [Page 152].

In discussing MS-DOS comparisons, it's interesting to note that the INTEL-8088 is segmented in much the same way as the GIME segmentation. But INTEL left out the DAT electronics. Most MS-DOS users don't know that the application software often handles the large-scale memory management. So what's all the excitement about? The point is, our operating system manages the memory, and since most programs are smaller in our systems than comparable MS-DOS systems, we rarely have to make special memory concessions. When necessary though, it's not inconvenient to multiple-load segments into other 64K-byte pages or make use of user memory RAM disks for large programs.

Paul Pollock
(PAULBELL)
Sepulveda, California

Foolish Pleasure?

Editor:

This letter concerns Don Hutchison's Database Report in the January 1989 issue. I have been very pleased in the past by the constructive articles found in the pages of RAINBOW, but I found a section of the Database Report that, in my opinion, is destructive to the CoCo Community.

In this report Mr. Hutchison describes the RAINBOW CoCo SIG's constructing of a benign Trojan horse as playful and interesting but fails to mention the foolishness and consequences of such a project.

Mr. Hutchison condones the construction of a program that leads to the vandalization and destruction of other users' disks. The Macintosh Trojan horses are examples of this project's outcome.

For the sake of all CoCo users, I hope we will cease support of the project and, instead, reinforce our trust in programs offered by Delphi.

Charles W. Blair
Brossard, Quebec

See the following response from CoCo SIG Database Manager Don Hutchison.

Woe! Charles

Editor:

It was certainly not the intent of my column nor the RAINBOW CoCo SIG to support the creation of a harmful virus or Trojan horse program. In actuality, I was simply reporting what others were discussing in the CoCo SIG's Forum: the creation of a pseudo-virus program, i.e., one innocuous in nature. The ultimate goal of such pursuits would be increased knowledge of how to protect oneself from harmful virus programs.

We cordially invite you, Charles, to join us online on Delphi to support your position with those originally involved in the virus discussion: Steve Bjork, Art Flexser, Marty Goodman, Mike Ward and others. I'm sure that you will then understand that no one is supporting the creation of a dangerous virus or Trojan horse program.

Don Hutchison
CoCo SIG Database Manager

Help for Milton

Editor:

I have just discovered Marty Goodman's set of programs to transfer text files from the CoCo to MS-DOS in the July 1986 issue of RAINBOW.

After having successfully used them for the past two weeks, I remembered reading a request from Milton Simpson of Big Flats, New York, asking for help with this problem. Your reply was to suggest two programs from Microcom Software at $79.95 and $39.95.

If Milton has dual single-sided drives on his CoCo capable of accessing 40 tracks and at least one 5¼-inch drive to run on his 1000 SX, he might be interested in Marty's programs. After all, they are practically free for the asking. All it takes is a back issue of the magazine or RAINBOW ON TAPE or DISK. It would be beneficial, however, to have a copy of the issue for the documentation.

John C. Schulz
Merritt Island, Florida

HINTS AND TIPS

Editor:

Thank you for publishing Dr. Marty Goodman's hardware fix for FD-500 and FD-502 disk drives [October '88, Page 58]. Because of its importance I wish to restate the problem: When any drive is accessed, all drive motors should be running.

It seems, from our customers' feedback, that other brands of dual drives are also in need of the same wiring change described in Dr. Goodman's article. If users have more than a single disk drive, they should perform the following steps to see if the drives are wired properly:

1. Open all drive doors and remove all disks from the drives.
2. Turn the computer on, type `DIR` and press ENTER.
3. While the first drive motor is spinning, check to see that *all other* drive motors are spinning.

If all drive motors are spinning, then your disk drives are wired properly.

If only the first drive motor is spinning, then your other drives are improperly wired. Contact the store where you purchased the drives to have them repaired.

There seems to be another real potential for trouble using modified or different disk operating system (DOS) ROMs and doubled-sided drives set up as follows:

Drive 0 front as Drive 0; back as Drive 2.
Drive 1 front as Drive 1; back as Drive 3.

The trouble is a mis-read of data on the disk and seems to stem from the way the head position of each drive is kept track of. The DOS can use either a two- or four- byte head position table for this purpose.

The following BASIC program allows double-sided drive users to determine the way their DOS handles the drive table. Type it in and insert a scratch disk, formatted on both sides, into Drive 0 and run the program:

```
10 POKE 2430,0:'DRIVE 0 HEAD POS
20 POKE 2431,0:'DRIVE 1 HEAD POS
```

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Phyllis.

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```
30 POKE 2432,0:'DRIVE 2 HEAD POS
40 POKE 2433, 0:'DRIVE 3 HEAD POS
50 PRINT"INSERT SCRATCH DISK FOR
MATTED ON BOTH SIDES (DRIVE 0 AN
D2)"
60 PRINT"THEN PRESS ANY KEY"
70 A$=INKEY$:IFA$="" THEN70
80 DIR0:'READ DRIVE 0 DIRECTORY
90 DIR2:'READ DRIVE 2 DIRECTORY
100 PRINT
110 IF (PEEK(2432)) = 17 THEN PR
INT"4 BYTE HEAD TABLE":END
120 IF (PEEK(2432)) = 0 THEN PR
INT"2 BYTE HEAD TABLE":END
```

The trouble seems to occur if a four-byte table is used with double-sided drives. The correct way to keep track of a double-sided disk drive's head is to have one byte per drive representing both sides, as opposed to two bytes per drive, one byte representing each side. Since the heads of a double-sided drive move together, they will each always be in the same position. Therefore, only one byte is needed to represent both heads.

If you have a four-byte head table, the following program will indicate if the mis-read trouble occurs with your DOS or not. Type it in, using the same procedure as above:

```
10 CLEAR 1000
20 PRINT"INSERT SCRATCH DISK FOR
MATTED ON BOTH SIDES (DRIVE 0 AN
D2)"
30 PRINT"THEN PRESS ANY KEY"
40 PRINT
50 A$=INKEY$:IF A$= "" THEN 50
60 A$="READ OK!"
70 DSKO$ 2,17,1,A$,B$
80 A$="READ BAD!"
90 DSKO$ 2,0,1,A$,B$
100 DSKI$ 2,4,1,A$,B$
110 DSKI$ 0,1,1,A$,B$
120 DSKI$ 2,17,1,A$,B$
130 PRINTA$
```

The program writes "Read OK" on Drive 2, Track 17, and writes "Read Bad!" on Drive 2, Track 0. It then reads Drive 2, Track 34, followed by Drive 0, Track 1. Finally, it attempts to read the data stored on Drive 2, Track 1. If the DOS is working properly, "Read OK!" stored on Track 1, should appear. If "Read Bad!" stored on Track 0 appears, there is a *serious* problem with the DOS using double- sided drives.

This mis-read trouble was discovered when a user sent us a set of *VIP Database* data disks that spanned across two double-sided drives. When *VIP Database* searched for a file on the back side of Drive 0 (Drive 2), the file was not found. He was using a DOS ROM he bought from a well-known Color Computer disk-drive vendor (not Radio Shack).

This mis-read can be duplicated if you have a CoCo 3 and RS-DOS 1.1 (or 2.1) and double-sided drives set up as outlined above. Poke the following locations to enable the double-sided drives. Format a disk on both sides (DSKINI0 and DSKINI2). Then run the second listing and watch it fail for yourself:

```
POKE 55453,1
POKE 55454,2
POKE 55455,65
POKE 55456,66
```

The cure was found when we tried the disks using RGB-DOS from RGB Computer Systems. RGB-DOS uses a two-byte head table instead of a four-byte head table and does *not* fail the mis-read test. If your DOS fails, you should contact the supplier and request an updated DOS ROM, which will not fail the above test.

Other double-sided drive configurations may also fail in a similar manner. But until the cause is found and cured, these double-sided drive users cannot be assured of proper disk operation.

Paul Anderson
SD Enterprises
Gresham, Oregon

INFO PLEASE

Editor:

I am not able to accumulate numerical data using Radio Shack's *Color Profile.* I want to calculate my history grade in percentage form.

The following datas were entered: assignment name, possible points and points received. To calculate the percentile, I need to accumulate the total possible points and total points received, then divide the total points received by total possible points. This is where my problem lies: I can't accumulate the total points received or the total possible points. *Color Profile* does not allow the use of an item number to calculate itself. Can anyone help me?

Also, what's the advantage of using OS-9? What can this operating system do that Disk BASIC can't do?

Hinh Phansavath
9267 Via Vista
Buena Park, California 90620

See Dennis Skala's "OS-9: Time for a Change" beginning on Page 58 of this issue.

Cyrus Chess for CoCo 3

Editor:

Ever since our initial subscription to RAINBOW last February 1988, my wife Fran and I eagerly look forward to receiving each issue of the magazine.

We are relatively new to the world of CoCo and have just purchased a CoCo 3. We enjoy many games, one being *Cyrus Chess* by Tandy (Cat. No. 26-3064). It worked fine on our CoCo 2 but not so with CoCo 3. Do you know of a patch or some way of making it compatible with our new CoCo 3? We appreciate any information you can give us.

George R. Freitag
4501 S. Ocean Blvd., D-2
Palm Beach, Florida 33480

REQUEST HOTLINE

Editor:

While cleaning my desk off, I found the 128K RAM chips left over from my 512K upgrade. I began thinking about how I could make use of these rather than let them sit in storage. When I am programming in C, I load the compiler into memory and put the source files in a RAM disk supplied with the Development Pak. Because of memory restrictions, I can only have the 96K driver. I would like both a bigger RAM drive and more internal memory (*Multi-Vue* requires a good size portion of memory).

Just a few days ago I was going through my back issues of RAINBOW and saw your article on clever uses for memory. How about the same type of project: 256- or 512-byte memory area that would work as a RAM disk under OS-9 Level II? I sketched out some rough schematics for one, but I lack the skill, money and resource materials for the various chips. It seems a workable idea either as an expansion board for Disto's Super Controllers or the MPI. I don't have either, though, so I would prefer it to be hard-wired in.

It is just another idea that may be of use to someone. Thanks for your time, and keep up the good work.

Jason McCampbell
St. Johns, Michigan

Golf or Pool Anyone?

Editor:

I own a 512K CoCo 3 with an RGB monitor, two FD-501 disk drives, a Multi-pak Interface, a DMP-105 printer and am also a subscriber to the best computer magazine money can buy — RAINBOW.

I have upgraded my computer to 512K and would like some software that will take full advantage of it. I'm specifically interested in golf and pool games, which are not as popular as space, Pac-Man and maze games, etc. I simply want to suggest to advertisers and program writers that it would be nice to have some different games.

I speak on behalf of several members of the Cornwall Color Computer Club in thanking RAINBOW for a priceless magazine.

Dave Malyon
Cornwall, Ontario

KUDOS

Editor:

I would like to express my gratitude to two companies who advertise in your magazine. First, my hat is off to Dayton Associates for its fast service. After placing my order by phone, I was told that the order would be in about a week after Thanksgiving. Well, lo and behold, two days before Thanksgiving, my printer was at my door. And I received no problems with the merchandise.

Secondly, I would like to thank Computer Plus for its fine service. During the past two years, I have purchased two CoCo 3s and a CM-8 monitor there. Each time I ordered, my product arrived promptly and in good condition.

I believe good, friendly and fast service is what makes people come back for more. Thanks again, Dayton Associates and Computer Plus!

Boisy Pitre
Brookhaven, Mississippi

Quick Fix

Editor:

I've bought your magazine every month now for the past two years, and it's helped me in so many ways. Well, you've done it again, RAINBOW. Thank you.

This past Christmas I received Tandy's *Home Publisher* software program. I couldn't wait to try it out, but to my dismay, the program would not print out on a DMP-130 printer. I then picked up January's issue of the RAINBOW and on Page 6 in Letters to the RAINBOW was a letter describing the same problem.

I received the fix the following Monday, patched it in and the *Home Publishers* program works just fine.

Once again this proves that your magazine is not only entertaining, but it keeps us all well informed. Thank you for your help.

I would also like to thank Tandy for the fix and the fast service.

Ronald H. Roberts
Brandon, Wisconsin

Keep Those Back Issues

Editor:

When I got my CoCo 2 about three years ago, I immediately began buying RAINBOW magazines. I was completely lost on everything in the magazine short of the advertisements for games. Slowly I learned BASIC and began going over old issues looking for things to type in. With your help I began to learn more about the CoCo, and as I did I found myself continually going back over old issues looking for articles to apply my new-found knowledge.

Surprisingly, this cycle never stops. Recently I found myself poring over RAINBOWs searching for articles on machine language and am just beginning to understand and apply some simple projects from the "Turn of the Screw" column. Just last week I opened up my new CoCo 3 and find myself today grabbing those old issues, looking for tips and software to apply to my new machine. The future of my old magazines looks bright as I move to new horizons such as OS-9 and other aspects that today only bring confusion.

Many thanks to the THE RAINBOW for the vast volumes of information that you work so hard to bring the experts and those of us who will one day be experts.

Douglas Berry
Nitro, West Virginia

THE RAINBOW welcomes letters to the editor. Mail should be addressed to: Letters to Rainbow, The Falsoft Building, P.O. Box 385, Prospect, KY 40059. Letters should include the writer's full name and address. Letters may be edited for purposes of clarity or to conserve space.

Letters to the editor may also be sent to us through our Delphi CoCo SIG. From the CoCo SIG> prompt, type `RAI` to take you into the Rainbow Magazine Services area of the SIG. At the RAINBOW> prompt, type `LET` to reach the LETTERS> prompt and then select Letters for Publication. Be sure to include your complete name and address.

Word Power 3.2

More Versatile • More Powerful With
Spooler • Calculator • Split-Screen • 2-Column Printing

> *"... friendly...amazing execution speed...much easier to use than VIP software & 2 other word processing systems I've tried...very user-friendly...massive text storage capacity ...highest among word processors..."* - **Rainbow Oct. 88 Review for Word Power**

Unparalleled Power packed in this 100% ML Word Processor written from scratch for the CoCo 3! **No other word processor offers such a wide array of features that are easy to learn & use.**

DISPLAY & SPEED

Word Power 3.2 runs at double-clock speed and uses the **true 80-column display** with lowercase instead of the graphics screen. The result is lightning fast screen reformatting and added speed! **All prompts are displayed in plain English in neat colored windows.** The current column number, line number, page number, percentage of free memory is displayed at all times. Even the **page break** is displayed so you know where one page ends and the other begins. The Setup program allows you to change fore/background colors as well as (in)visible carriage returns. Word Power 3.2 can be used with RGB/Composite/Monochrome monitors as well as TV.

MAXIMUM MEMORY

Word Power 3.2 gives you **over 72K** on 128K and **over 450K** on 512K CoCo 3 for Text Storage - more memory than any other CoCo word-processor. Period.

EFFORTLESS EDITING

Word Power 3.2 has one of the **most powerful and user-friendly full-screen editor with word-wrap.** All you do is type. Word Power takes care of the text arrangement. The unique **Auto-Save** feature saves text to disk at regular intervals for peace of mind.

Insert/Overstrike Mode (Cursor Style Changes to indicate mode);OOPS Recall during delete;Type-ahead Buffer for fast typers;Key-Repeat (adjustable); Key-Click; 4-way cursor and scrolling; Cursor to beginning/end of text, beginning/end of line, top/bottom of screen, next/previous word; Page up/down; Delete character, previous/next word, to beginning/end of line, complete line, text before/after cursor; Locate/Replace with Wild-Card Search with auto/manual replace; Block Mark, Unmark, Copy, Move & Delete; Line Positioning (Center/Right Justified); Set/Reset 120 programmable tab stops; Word-Count; Define Top/Bottom/Left/Right margins & page length. You can also highlight text (underline-with on-screen underlining, bold, italics, superscripts, etc.). Word Power even has a **HELP** screen which an be accessed any time during edit.

SPLIT-SCREEN EDITING

Splits the screen in half so you can view one portion of your text while you edit another. You'll love it!

MAIL-MERGE

Ever try mailing out the same letter to 50 different people? Could be quite a chore. Not with Word Power 3.2! Using this feature, you can type a letter, follow it with a list of addresses and have Word Power print out personalized letters. It's that easy!

CALCULATOR

Pop-up a 4-function calculator while you edit! Great for tables!

SAVING/LOADING TEXT

Word Power 3.2 creates ASCII format files which are compatible with almost all terminal/spell-checking & other word-processing programs. Allows you to Display Free Space, Load, Save, Append & Kill files. The ARE YOU SURE? prompt prevents accidental overwriting & deletion. You can select files by simply cursoring through the disk directory. Supports double-sided drives & step-rates.

PRINTING

Word Power 3.2 drives almost any printer (DMP, EPSON, GEMINI, OKIDATA, etc). Allows options such as baud rates, line spacing, page/print pause, partial print, page numbering/placement, linefeeds, multi-line headers/footers, right justification & number of copies. The values of these parameters & margins can be changed anytime in the text by embedding Printer Option Codes. The **WHAT YOU SEE IS WHAT YOU GET** feature allows you to preview the text on the screen as it will appear in print. You can view margins, page breaks, justification & more.

PRINT SPOOLER

Why buy a hardware Print Spooler? Word Power 3.2 has a **built-in Spooler** which allows you to simultaneously edit one document & print another.

TWO-COLUMN PRINTING

This unique feature allows you to print all or portion of your text **in two columns!** Create professional documents without hours of aligning text.

SPELLING CHECKER

DICTIONARY

Word Power 3.2 comes with spelling checker/dictionary which finds & corrects mistakes in your text. You can add words to /delete words from dictionary.

PUNCTUATION CHECKER

This checker will proofread your text for punctuation errors such as capitalization, double-words, spaces after periods/commas, and more. Its the perfect addition to any word processor.

DOCUMENTATION

Word Power 3.2 comes with a well-written instruction manual & reference card which makes writing with Word Power a **piece of cake!** Word Power 3.2 comes on an UNPROTECTED disk and is compatible with RSDOS. **Only $79.95**

(Word Power 3.1 owners can get Word Power 3.2 Upgrade FREE by sending proof of purchase & $5.00 to cover S&H costs & instructions)

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All Word Power 3.2 orders shipped by **UPS Next Day Air** at no extra charge within the Continental US. Offer good thru January 15, 1989. →

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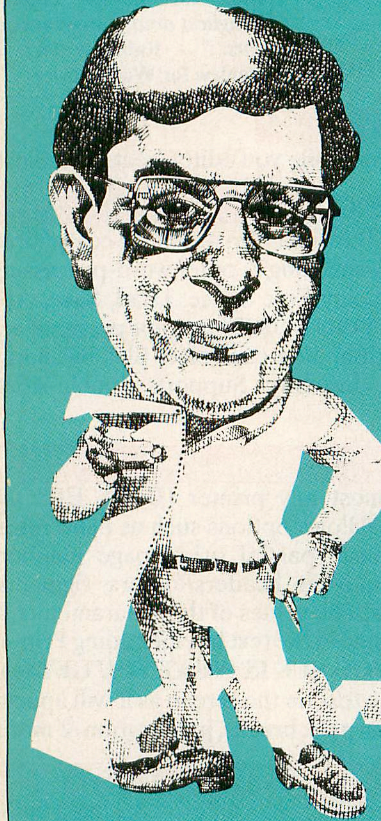

CoCo's Canadian Future

Unless you live in Canada, you may not know that Radio Shack intends to end sales of our favorite computer in that country as soon as supplies are gone. During the holiday season a special sale was held at which CoCo 3s went for $99.95 Canadian — so cheap it defies description.

(As I write this, a Canadian dollar is worth 85 cents U.S., which is stronger than it has been. This means, of course, the price of a Canadian CoCo is about $84 U.S. However, the reverse applies when you buy an American product — which the CoCo is — in Canada. And INTERTAN, the company that operates Radio Shack in Canada now, has to pay in U.S. dollars for CoCos. Thus, the price of a Color Computer (or any computer, for that matter) is higher in Canada than in the United States.)

I have received letters from some concerned readers and have been making replies as quickly as possible. To put this into perspective, I thought you would be interested in seeing one of the replies.

Please note the points I make about continued support, probable continued software product development (through the United States) and, perhaps most important, the address of INTERTAN in Canada. If you are unhappy with this decision, it is your right to let them know.

Dear Tony:

The information you have from your local Radio Shack authorized dealer is right: INTERTAN — not Tandy Corporation — is clearing out all Color Computers in Canada for $99.95 in your funds.

More than a year ago, INTERTAN came into being. Before that, Tandy in Canada and Tandy in the United States were the same company, although the Canadian part was a subsidiary. Then Tandy spun off a company called INTERTAN, which has its own officers and its own stock and makes its own decisions. One of those decisions was to end sales of the Color Computer in Canada.

One of the main reasons for this is that Canadians have long been able to buy Color Computers in the United States much less expensively than

Max-10™

Best Desktop Publishing / Document Creator for the CoCo 3. Features Pull Down Menus, What You See Is What You Get, UNDO, integrated text & graphics capability, multiple fonts & more. Graphics can be imported from CoCo Max I,II,III, MGE, MGF, 5 Level DS-69, PMODE 4, HSCREEN 2/3 pictures. Supports: DMP 105/130, EPSON MX/FX/RXLX/ Gemini 10 Series, CGP-220 and OKI-92. Only **$79.95**

VIP CALC III

Best Spreadsheet for your CoCo 3. Features 4 color menus, 32/40/64/80 column display, 2 Mhz speed & more. Allows up to 1024 rows x 512 columns. VIP Calc III also has up to 16 windows, trig, averaging, sorting, algebraic & sorting functions. Locate, block move/copy commands & limitless programmable functions. Works with **any** printer. Only **$69.95**

Font Disk #1,#2 for CoCo Graphics Designer: $19.95 each

COLOR SCHEMATIC DESIGNER

By Prakash Mishra

An excellent Circuit Schematic Design Software Package for CoCo 3. Features:

- *** Runs in 640x192 at 1.8 Mhz**
- *** Pull Down Menus**
- *** Keyboard/Mouse/Joystck Support**
- *** RGB/ Composite/Monochrome Monitor Support**
- *** 72 Modifiable Symbols**
- *** Multiple Hi-Res Fonts**
- *** Multiple UNDO Command**
- *** Symbol Rotate/Line/Box Draw**
- *** Supports 3 Layers of Circuits**
- *** Powerful Screen Print Command for DMP/Gemini/Epson Printers**
- *** Complete Documentation**

Only $39.95

RSB

A Revolutionary Program that allows you to use Basic Programs from OS9!

OS9 Level 2 is the future of the CoCo. Unfortunately, most Basic Programmers are "afraid" of using OS9 because it is different from Basic. Introducing RSB! It allows you to run Basic from OS9 and take advantage of features such as multitasking, no-halt floppies and high speed operation. RSB is your first step into OS9! Req. OS9 Level II. Only **$39.95**

4-D Chess

The ancient game of strategy moves into the future. HSCREEN 2 for normal play, HSCREEN 4 for triple level play. Move your pieces through time as well as space. Req. RSDOS 128K CoCo 3 and 2 Players. Disk Only **$24.95**

ULTRAPATCH SYSTEM

by Randall Reid

Patches the Superpatch EDTASM + ® for 80 columns, 47K Buffer (approximately 3000 lines!) & more. Req CoCo 3. Only **$19.95**

GAMES

(Disk only)
(CoCo 1,2 & 3 except where mentioned)

WARRIOR KING (CoCo 3): $29.95
IN QUEST OF STAR LORD(Animated Graphics Adventure for CoCo 3): **$34.95** **Hint Sheet: $3.95**
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FLIGHT 16: $34.95
PYRAMIX(Cubix for CoCo 3): **$24.95**
KUNG FU DUDE: $24.95
DRAGON BLADE: $19.95
CHAMPION: $19.95
WHITE FIRE OF ETERNITY: $19.95
QUEST FOR THE SPIRIT STONE (CoCo 3): $18
WARGAME DESIGNER (CoCo 3): $29
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An amazingly versatile program that allows you to Format/Duplicate / Read/ Write disks from over 300 different computers. For example you could transfer programs between CoCo, IBM, PC-DOS, TRS-80 Model 3, TRS-80 Model 4, TRS-80 Model 100, Xerox 820, Zenith, Kaypro II, Novell , NEC DOS and much much more!! Send for FREE List. Requires an IBM Compatible with 2 drives. Disk $79.95.

512K BACKUP LIGHTNING

(From Colorventure)
The ultimate CoCo 3 disk copying utility!! Reads your master diskette once and then makes as many copies as you want. It automatically formats an unformatted disk while copying! Supports 35, 40 or 80 track drives with various step rates. A must for any disk user!! Only $19.95

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Never wait for your printer again!! This Print Spooler allows you to print to your printer and simultaneously continue with your programming. No need to wait for those long printouts! Disk Only $19.95

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A Full Screen Editor for Basic Programs!! A Must for anyone who writes Basic Programs. Only $24.95

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UPS 2ND DAY AIR

in Canada because of the difference in the value of currency. (That, by the way, is one of the reasons we have to charge more for Canadian subscriptions than those in the United States.) Because of this, actual "in-Canada" sales (as opposed to sales to Canadians) have always lagged behind those in the United States.

Although you will not be able to buy a Color Computer from an official Radio Shack dealer in Canada after the inventory is gone, you will, of course, be able to buy one through an authorized dealer or Radio Shack store in the United States. Further, I feel certain support — in the form of more hardware and software — for your Color Computer will continue in Canada, certainly from the third-party advertisers you see in THE RAINBOW, *but also from INTERTAN.*

INTERTAN is experimenting with a number of marketing proposals at this time. This is but one decision it has made that is very different from that of Tandy Corporation in the United States. Indeed, Tandy is not only continuing to sell our CoCo but is also manufacturing more of them for sale in the future.

I really want to emphasize this to you, Tony, and to anyone you may happen to discuss it with: The CoCo is not only still being sold, but is still being manufactured in the United States by Tandy for sale in the future. But, even were — and I must emphasize the word were — the CoCo no longer to be manufactured even in the United States, the history of Tandy Corporation is to continue to support computers which it no longer actively sells. This means several things: support, software and hardware products, and — most important — service. I would assume INTERTAN will follow this policy.

Finally, since Tandy is still making CoCos, INTERTAN might well at some time in the future buy them from Tandy again (which is where it gets them) and sell them again. If you want to encourage INTERTAN to do this, you can write to the company at 279 Bayview Drive, P. O. Box 34000, Barrie, ON L4M 4W5, Canada.

You will get good use from your CoCo for a long time to come!

Sincerely,

Lawrence C. Falk

As a footnote to all this, Tandy's "overseas" operations (now INTERTAN) have always been somewhat different, and they appear to be getting more so. We hear reports that some places are "experimenting" with items such as refrigerators and washing machines in their stores. Others, we hear, are selling such products as JVC and RCA video and audio equipment — some in addition to Tandy equipment, some in place of it.

It will be interesting to see whether making the overseas Radio Shack stores different works out for Tandy and INTERTAN — and whether the agreement between Canada and the United States to lower trade barriers between the two countries has a significant effect on computer hardware and software sales. Personally I think they will, and my comment in the letter above, that INTERTAN may well begin to sell the CoCo again, is not merely wishful thinking.

— Lonnie Falk

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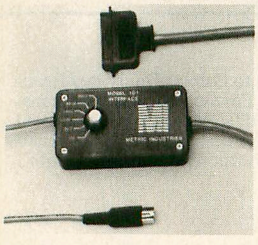
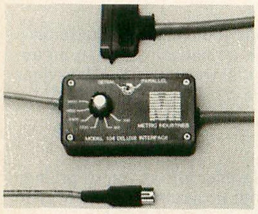


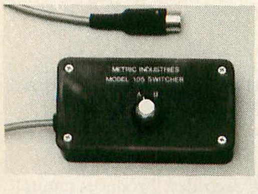
Model 101
Serial to Parallel Printer Interface

★ Works with any COCO
★ Compatible with "Centronics" Parallel Input Printers
★ Just turn the knob to select any one of 6 baud rates 300-9600
★ Comes complete with cables to connect to your printer and computer
★ Can be powered by most printers



Model 104 Deluxe Interface with "Modem Switch"

★ **Same Features as 101 Plus**
★ Built in Serial Port for your Modem or other serial device
★ Switch between Serial Output and Parallel Output
★ Comes with cables to connect to your computer and printer
★ Can be powered by most printers



Model 105 Serial Switch

★ Connects to your COCO to give you 2 switch selectable Serial Ports
★ Comes with a 3 foot cable to connect to your computer
★ Now you can connect your Printer (or printer interface) and your Modem (or other serial device) to your COCO and flip the switch to use either device
★ Does not require power

Cassette Label Printing Program

★ **New Version 2.1 prints 7 lines** of information on Cassette labels
★ Comes on Tape with instructions to transfer to disk
★ Menu driven, very easy to use
★ **Save and Load Labels from Tape and Disk**
★ Uses the features of your printer to print standard, expanded, and condensed characters
★ **Automatically Centers Each Line of Text**
★ Allows editing of label before printing
★ Program comes with 24 labels to get you started
★ 16K ECB required

Some of the Printers That Can –
Supply power for the 101 and 104 are Radio Shack, Star, Okidata, Brother, Juki, and Smith Corona.

Some of the Printers That Cannot –
Supply power for the interfaces are Epson, Seikosha, Panasonic, Silver Reed and NEC. If your printer cannot supply power to the interface you can order your interface with the "P" option or you can supply your own AC adapter. We recommend the Radio Shack 273-1431 AC adapter with a 274-328 connector adapter.

Write or call for more information or for technical assistance.

Price List

Model 101	**35.95**
Model 101P	41.95
Model 104	44.95
Model 104P	51.95
Model 105	14.95
Cassette Label Program	6.95
Pin Feed Cassette Labels:	
White	3.00/100
Colors (specify)	3.60/C
Red-Blue-Yellow-Tan	

4 Pin Din Serial COCO Cables:

Male/Male 6 foot	4.49
Male/Female 6 foot	4.49
Female/Female 6 foot	4.49
Other Lengths Available.	

All items covered by a 1 year warranty

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CoCo 3 Utilities Galore

(CoCo 2 Versions included where specified)
(All Programs are for RSDOS unless specified)

SUPER TAPE/DISK TRANSFER

- * Disk-to-Disk Copy * Tape-to-Disk Copy
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Copies Basic/ML/Data Files. CoCo 1,2 or 3. Req. min. 64K Disk System. Disk Only **$24.95**

CEBBS

Best BBS for CoCo 3. Xmodem Up/Downloading, unlimited menus, login, message base, built-in clock/calendar, execution of external programs. Sysop has full control of user's acess to menus, time on system & remote system access. Full Error Trapping. HyperIO Compatible! Reg. $59.95. Intro. Special $49.95. Min Req CoCo 3, 1 Drive, RS232 Pack.

DISK UTILITY 2.1A

A multi-featured tool for USER FRIENDLY disk handling. Utilize a directory window to selectively sort, move, rename & kill file entries. Lightning fast Disk I/O for format, copy & backup. Single key execution of Basic/ML programs. This will become your MOST USED program !! CoCo 1,2 or 3. Req. Min. 64K. Disk Only **$24.95**

MAILLIST PRO

The ultimate mailing list program. Allows you to add, edit, view, delete, change, sort (by zipcode or name) and print labels. Its indispensible!! Disk **$19.95** (CoCo 2 version included)

DISK LABEL MAKER

Allows you to design professional disk labels! Allows elongated, normal and condensed format for text. Double Strike, Border Creation, and multiple label printing. Its a MUST for any user with a disk drive. Supports DMP 105/106/110/120/ 130/430, GEMINI, STAR, EPSON and compatibles. (CoCo 2 version included). Only **$19.95**

COCO UTIL II

COCO-DOS MS-DOS

(Latest Version): Transfer CoCo Disk files to IBM compatible computer and vica-versa. Requires 2-Drive IBM Compatible. Disk **$39.95**

RGB PATCH

Displays most games in color on RGB monitors. CoCo 3 Disk **$24.95**

COMPUTERIZED CHECKBOOK

Why bother with balancing your checkbook? Let the CoCo do it for you. Allows you to add, view, search, edit, change, delete and printout (in a table/individual entry format) checkbook entries. Updates balance after each entry. Allows files for checking, savings, and other accounts. Disk **$19.95.** (CoCo 2 version included)

BOWLING SCORE KEEPER

An excellent utility to keep track of your bowling scores. Allows you to save scores under individuals or teams. You can edit change, delete, and compare scores. A must for anyone who wants to keep track of his or her bowling performance. Disk $19.95 (CoCo 2 version included)

VCR TAPE ORGANIZER

Organize your videotapes with this program. Allows you to index tapes by title, rating, type, play time and comments. Also allows you to sort titles alphabetically & view/print selected tapes. If you own a VCR, this program is a MUST!! Disk $19.95 (CoCo 2 version included)

COCO 3 SCREEN DUMP

Fantastic

32, 40, 80 column text dump, PMODE 4 Graphics Dump. Single Keystroke Operation allows you to take snapshots of your screens even when programs are running! Works on DMP's, Epson, Gemini and compatibles. CoCo 1, 2 and 3. Disk **$24.95**

HOME BILL MANAGER

Let the CoCo keep track of your bills. Allows you to enter bills under various categories and reminds you when they are due. Disk **$19.95**

CALENDAR MAKER

Generate monthly calendars on your printer for any year in the 20th century. Disk Only **$19.95** (CoCo 2 version included)

ADOS 3

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How To Read Rainbow

When we use the term CoCo, we refer to an affectionate name that was first given to the Tandy Color Computer by its many fans, users and owners.

The BASIC program listings printed in THE RAINBOW are formatted for a 32-character screen — so they show up just as they do on your CoCo screen. One easy way to check on the accuracy of your typing is to compare what character "goes under" what. If the characters match — and your line endings come out the same — you have a pretty good way of knowing that your typing is accurate.

We also have "key boxes" to show you the *minimum* system a program needs. But, *do* read the text before you start typing.

Finally, the little disk and/or cassette symbols on the table of contents and at the beginning of articles indicate that the program is available through our RAINBOW ON DISK or RAINBOW ON TAPE service.

Using Machine Language

The easiest way to "put" a machine language program into memory is to use an editor/assembler, a program you can purchase from a number of sources. All you have to do, essentially, is copy the relevant instructions from THE RAINBOW's listing into CoCo.

Another method of putting an ML listing into CoCo is called "hand assembly" — assembly by hand, which *sometimes* causes problems with `ORIGIN` or `EQUATE` statements. You ought to know something about assembly to try this.

Use the following program if you want to hand-assemble ML listings:

```
10 CLEAR200,&H3F00:I=&H3F80
20 PRINT "ADDRESS:";HEX$(I);
30 INPUT "BYTE";B$
40 POKE I, VAL("&H"+B$)
50 I=I+1:GOTO 20
```

This program assumes you have a 16K CoCo. If you have 32K, change the `&H3F00` in Line 10 to `&H7F00` and change the value of `I` to `&H7F80`.

OS-9 and RAINBOW ON DISK

The OS-9 side of RAINBOW ON DISK contains two directories: `CMDS` and `SOURCE`. It also contains a file, `read.me.first`, which explains the division of the two directories. The `CMDS` directory contains executable programs and the `SOURCE` directory contains the ASCII source code for these programs. BASIC09 programs will only be offered in source form so they will only be found in the `SOURCE` directory.

OS-9 is a very powerful operating system. Because of this, it is not easy to learn at first. However, while we can give specific instructions for using the OS-9 programs, you will find that the OS-9 programs will be of little use unless you are familiar with the operating system. For this reason, if you haven't "learned" OS-9 or are not comfortable with it, we suggest you read *The Complete Rainbow Guide to OS-9* by Dale Puckett and Peter Dibble.

The following is not intended as a course in OS-9. It merely states how to get the OS-9 programs from RAINBOW ON DISK to your OS-9 system disk. Use the procedures appropriate for your system. Before doing so, however, boot the OS-9 operating system according to the documentation from Radio Shack.

1) Type `load dir list copy` and press ENTER.
2) If you have only one disk drive, remove the OS-9 system disk from Drive 0 and replace it with the OS-9 side of RAINBOW ON DISK. Then type `chd/d0` and press ENTER. If you have two disk drives, leave the sytem master in Drive 0 and put the RAINBOW ON DISK in Drive 1. Then type `chd/d1` and press ENTER.
3) List the `read.me.first` file to the screen by typing `list read.me.first` and pressing ENTER.
4) Entering `dir` will give you a directory of the OS-9 side of RAINBOW ON DISK. To see what programs are in the `CMDS` directory, enter `dir cmds`. Follow a similar method to see what source files are in the `SOURCE` directory.
5) When you find a program you want to use, copy it to the `CMDS` directory on your system disk with one of the following commands:

One-drive system: `copy /d0/cmds/`*filename* `/d0/cmds/`*filename* `-s`

The system will prompt you to alternately place the source disk (RAINBOW ON DISK) or the destination disk (system disk) in Drive 0.

Two-drive system: `copy /d1/cmds/`*filename* `/d0/cmds/` *filename*

Once you have copied the program, you execute it from your system master by placing that disk in Drive 0 and entering the name of the file.

The Rainbow Seal

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The Rainbow Certification Seal is our way of helping you, the consumer. The purpose of the Seal is to certify to you that any product that carries the Seal has actually been seen by us, that it does, indeed, exist and that we have a sample copy here at THE RAINBOW.

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There is absolutely no relationship between advertising in THE RAINBOW and the certification process. Certification is open and available to any product pertaining to CoCo. A Seal will be awarded to *any* commercial product, regardless of whether the firm advertises or not.

We will appreciate knowing of instances of violation of Seal use.

Rainbow Check Plus

The small box accompanying a program listing in THE RAINBOW is a "check sum" system, which is designed to help you type in programs accurately.

Rainbow Check PLUS counts the number and values of characters you type in. You can then compare the number you get to those printed in THE RAINBOW. On longer programs, some benchmark lines are given. When you reach the end of one of those lines with your typing, simply check to see if the numbers match.

To use *Rainbow Check PLUS*, type in the program and save it for later use, then type in the command `RUN` and press ENTER. Once the program has run, type `NEW` and press ENTER to remove it from the area where the program you're typing in will go.

Now, while keying in a listing from THE RAINBOW, whenever you press the down arrow key, your CoCo gives the check sum based on the length and content of the program in memory. This is to check against the numbers printed in THE RAINBOW. If your number is different, check the listing carefully to be sure you typed in the correct BASIC program code. For more details on this helpful utility, refer to H. Allen Curtis' article on Page 21 of the February 1984 RAINBOW.

Since *Rainbow Check PLUS* counts spaces and punctuation, be sure to type in the listing exactly the way it's given in the magazine.

```
10 CLS:X=256*PEEK(35)+178
20 CLEAR 25,X-1
30 X=256*PEEK (35)+178
40 FOR Z=X TO X+77
50 READ Y:W=W+Y:PRINT Z,Y;W
60 POKE Z,Y:NEXT
70 IFW=7985THEN80ELSEPRINT
   "DATA ERROR":STOP
80 EXEC X:END
90 DATA 182, 1, 106, 167, 140, 60, 134
100 DATA 126, 183, 1, 106, 190, 1, 107
110 DATA 175, 140, 50, 48, 140, 4, 191
120 DATA 1, 107, 57, 129, 10, 38, 38
130 DATA 52, 22, 79, 158, 25, 230, 129
140 DATA 39, 12, 171, 128, 171, 128
150 DATA 230, 132, 38, 250, 48, 1, 32
160 DATA 240, 183, 2, 222, 48, 140, 14
170 DATA 159, 166, 166, 132, 28, 254
180 DATA 189, 173, 198, 53, 22, 126, 0
190 DATA 0, 135, 255, 134, 40, 55
200 DATA 51, 52, 41, 0
```

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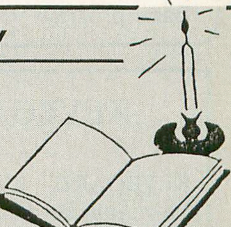

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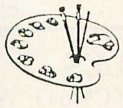

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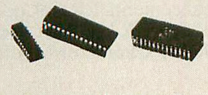

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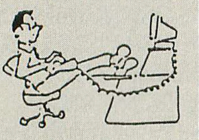

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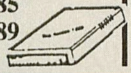

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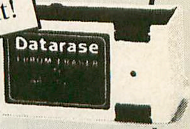

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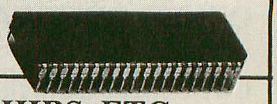

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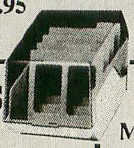

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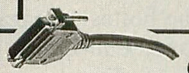

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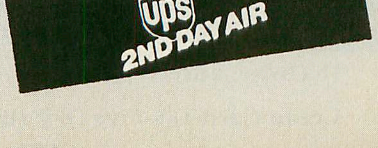

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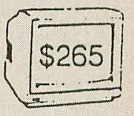

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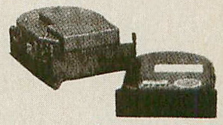

Seagate 20 Meg System: $509
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1000 Sheets of paper included **FREE** with every printer

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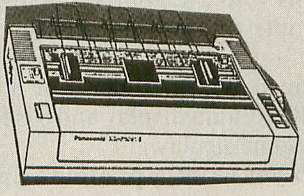

Panasonic KX-P1080i II System: Panasonic Printer w/ 144 cps Draft • Tractor/Friction Feed • Epson/IBM Compatible • 2 Year Warranty. Only **$189**

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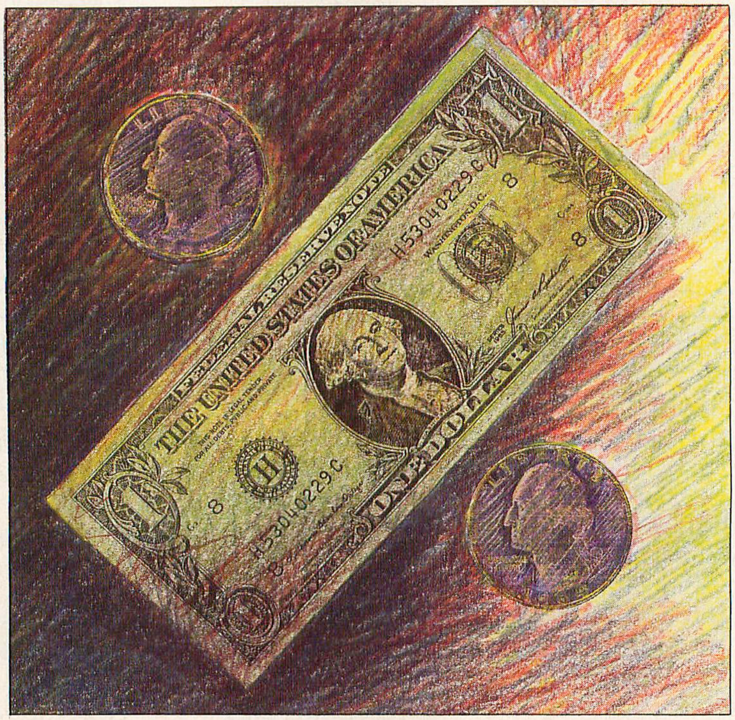


Lil' Ole Interest, Revisited

By Duke Norris

Lil' Ole Interest Monitor, by Francis S. Kalinowski, is a program that first appeared in the September 1984 issue of RAINBOW. It gives a detailed printout and/or display of how your various bank accounts are growing.

As originally written, the program requires at least a 16K CoCo with Extended Color BASIC, accepts user inputs for up to 11 money accounts and the interest rates, and calculates and prints accounts and earnings information for each day of a selected compounding period.

Because in the computer world, change is the norm, monotony the exception, I have taken a good program and made it better. The program now displays on the CM-8 monitor's screen either 40- or 80-column widths and fully utilizes the DMP-132 printer features. The user also no longer needs to worry about memory constraints.

The modified program requires a CoCo 3, cassette or disk drive and an RGB monitor. A printer is optional. It begins with a graphics title display and prompts you for three items:

- Screen Width? Enter 4 or 8. (4 is for a 40-column display and 8 is for an 80-column display.)
- Do you want a printout? Enter Y or N.
- Press the space bar when you are ready to begin.

Now you are ready to enter answers to a series of prompts so the program can do it's work:

- The starting date, if a printout was selected.
- The account owner's name.
- The number of accounts to calculate. (The program will calculate from 1 to 11 accounts.)
- The number of compounding days for all the accounts.
- The starting balance of each account.
- The interest rate calculated on each account.

After you have seen the results of what you have entered, you are then prompted for:

- Calculate more account(s)? Enter Y or N.
- Do you want a printout? Enter Y or N.

User Modifications

As you key in the program, there are three program areas where you might have to make modifications to this version of the program to best fit your CoCo system configuration:

- Program Line 190 by `POKE`ing the value of `18` in location `150` to operate the DMP-132 printer at 2400 baud. You

---

Duke Norris has been working with computers for over 20 years. His first home computer was a 4K CoCo 1 and he is the SysOp of Shelby County Indiana's oldest BBS. Hobbies include computers and restoring classic cars and trucks.

COLORWARE Introduces

THE WORKS

"Your CoCo 3 will think it's a Mac."

GRAPHIC DESIGN / WORD PROCESSING / SPELLCHECKER

The Ultimate in Desktop Publishing

The Works includes everything below

All for $149.95

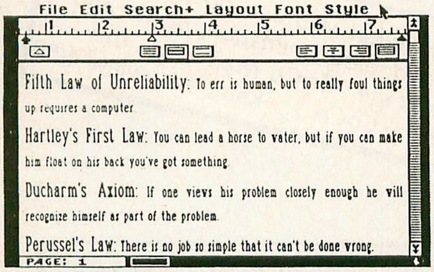
Save $80.00

Max-10+

Now with online 40,000 word spellchecker

Regularly $79.95

The latest in CoCo word processors and the only one with true WYSIWYG (What You See Is What You Get) output. Mix graphics with text. Max-10 is great for anything from greeting cards up to newsletters. Just turn the next page for a full list of Max-10's unbelievable features.



Fifth Law of Unreliability: To err is human, but to really foul things up requires a computer

Hartley's First Law: You can lead a horse to vater, but if you can make him float on his back you've got something.

Ducharm's Axiom: If one vievs his problem closely enough he vill recognize himself as part of the problem.

Perussel's Law: There is no job so simple that it can't be done vrong.

Max-10 Font Set

Regularly $29.95

36 fonts on 2 disks. Can all be used easily and quickly with Max-10.

Frontier 18 point
Athens 18 point
Irvine 12 point
Irvine 24
Swan Song 12 point
Swan Song 24
Ellesmere 12 point
Ellesmere 24 point
Ellesmere Bold 24
Digital 12 point

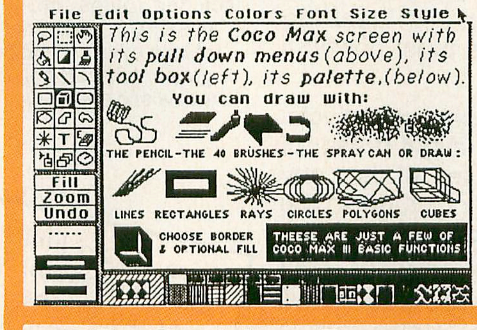
Longhand 24
Hollow 12 point
Hollow 18 point
Rome 9 point
Rome 12 point
Stencil 18 point
Futura 24
Courier 12 point
Brookhaven 18
Thames 18 point
San Francisco 18
Century 24

All these and 14 more!

CoCo Max III

Regularly $79.95

The ultimate graphics creation program. See the list of features on the next page. Also read the superb review in **The Rainbow**, *April 1988*.



This is the Coco Max screen with its pull down menus (above), its tool box (left), its palette, (below).

You can draw with:

THE PENCIL - THE 40 BRUSHES - THE SPRAY CAN OR DRAW:

LINES RECTANGLES RAYS CIRCLES POLYGONS CUBES

CHOOSE BORDER & OPTIONAL FILL

THEESE ARE JUST A FEW OF COCO MAX III BASIC FUNCTIONS

CoCo Max Fonts

Regularly $49.95

Almost 100 fonts for incredible headlines and text. Four disks full of fonts. Use CoCo Max styles (Bold, Italic, 3-D, Shadow ...), sizing and colors for absolutely wonderful effects. Thousands of combinations are possible. Here are some of the fonts:

Harlow
Koloss
maharajah
Peignot Small
Peignot Large
Program Small
PROGRAM MEDIUM
PROGRAM LARGE
Futura Black Small
FUTURA BLK. LG
HANG UP
LIQUID CRYSTAL
Моспоя Смвлл
Моспоя Ларге
ORBIT
POINT OUT
Printout Small
PRINTOUT LARGE

Digital Small
Digital Medium
Digital Large
Futura
Grid Small
GRID LARGE
HAIFA
TABLEAU
Victory
Baby Teeth Small
BABY TEETH LG.
BOBO BOLD
Cartwheel
Normande Small
Normande Medium
NORMANDE LG.
Plano
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We understand perfectly that you have no reason to believe anything you read. Including this ad. (Or the rave reviews)

So we invite you to evaluate **The Works** yourself. Call and order it. We'll send it with detailed, clear instructions. Use it with your own CoCo 3, on your own work, for 30 days. Try it for brilliant presentation graphics, outstanding word processing. Wring it out.

After 30 days, if it isn't for you, for any reason, we'll take it back and write you a check immediately for your full purchase price.

The risk is all ours. But we urge you not to wait, this deal may end soon. We can guarantee this price only if you order now.

Call today. You have nothing to lose.

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Order line open weekdays 9 to 5 Eastern time

See next page for more ordering info.

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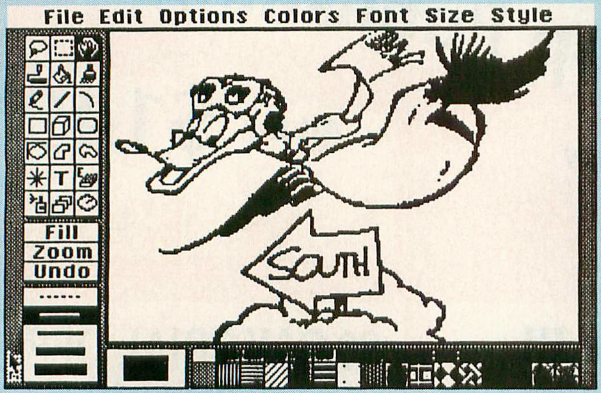
NEW REAL DESKTOP

CoCo Max™ III AND



CoCo Max III is absolutely the best drawing package available for the CoCo 3, and it does more than just let you draw. **CoCo Max III** includes animation, text, color mixing and more features than you would think possible. It combines incredible speed with dazzling graphics and it is a joy to use even its most powerful features.

Pictures, graphs, flyers, cards, signs, school projects, labels, buttons and anything else you might dream of creating is now possible with **CoCo Max III.** Is it any wonder that the majority of CoCo Gallery pictures in the last five months were created with **CoCo Max?**

Thousands of CoCo users have found that you don't have to be an artist to have fun with **CoCo Max**. You'll wonder why you waited so long to get the incredible **CoCo Max III**.

CoCo Max III is the best because it includes:
- a huge picture area (*two* full hi-res 320x192 screens) - a large editing window - Zoom mode for detail work - 28 drawing tools which you just point and click on - shrink and stretch - rotation at any angle (1.5 degree steps) - 512K memory support (*all* features work with 128K too) - an Undo feature to correct mistakes - you can even Undo an "Undo" - Animation - special effects - color sequencing (8 colors, variable speed) - thirteen fonts (more available) - each font has eight different sizes - five style options (bold, italic, 3D, etc.) for thousands of font/size/style combination possibilities. - the CoCo Show "slide show" program - color editing of patterns - automatic pattern alignment - prints in single and double size - smart lasso (move text over a background...) - advanced tools: arc, ray, cube, etc. - select 16 of the 64 colors (all 64 colors are displayed at once for selection!) - picture converter (CoCo Max II, MGE, BASIC) - extensive prompting - "glyphic" clipbook of rubber stamps - double click shortcuts - color mixing (additive/subtractive/none) - money back guarantee - sophisticated data compression saves disk space - pull down menus (no commands to remember) - forty paintbrush shapes - two color lettering - spray can - scrapbooks of pictures - error free - Y-cable or multipack not required - high speed hi-res interface included (plugs into joystick port) - disk is not copy protected - amazing "flowbrush" - RGB and composite monitor support - replace color - printing on black and white printers in five shades of gray - full color printing with optional drivers for the NX-1000 Rainbow and CGP220 - entirely rewritten for the CoCo 3

> There are no limits to what you can do with this fabulous program. Speed, ease, animation, power and color, all in one package. **CoCo Max III** is the ultimate program for the CoCo 3. –Rainbow review 4/88

CoCo Max III: $79.95

Max-10 owners: deduct $10

System Requirements:
CoCo 3 disk system and a Joystick or Mouse

Printer drivers included:
IBM/Epson and compatibles, GEMINI, DMP105/106/130,OKI182/192, CGP220 (B&W), DMP110, DMP200

Color printer drivers (prints 125 different colors) Star NX-1000, CGP-220, or Okimate 20 each **$19.95**

For all CoCo Max Versions

Max Edit Font Editor: A font is a set of characters of a particular style. With Max Edit you can create new fonts or modify the existing ones. **$19.95**

Max Font disks (send for list) each **$19.95**

Max Font Set (95 fonts on 4 disks) **$49.95**

DS69/69B Digitizers: allows you to capture the image from a VCR or video camera and bring it into your computer. CoCo Max will let you load digitized pictures and modify them.

DS-69 (2 images per second. Requires multipak) **$99.95**

DS-69B (8 images/second) **$149.95**

CoCo 1 & 2 Owners Still Available:

(See previous ads or write for information)

CoCo Max II (works on all disk CoCos) **$69.95**

CoCo Max Tape (CoCo 1 & 2 only) **$59.95**

Y-Cable **$24.95**

CoCo Max II Picture Disk Set set of 3 disks: **$29.95**

Guaranteed Satisfaction

Use CoCo Max or Max-10 for a full month. If you are not delighted with either of them, we will refund every penny.

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Add $3 per order for shipping ($5 to Canada, 10% to overseas)
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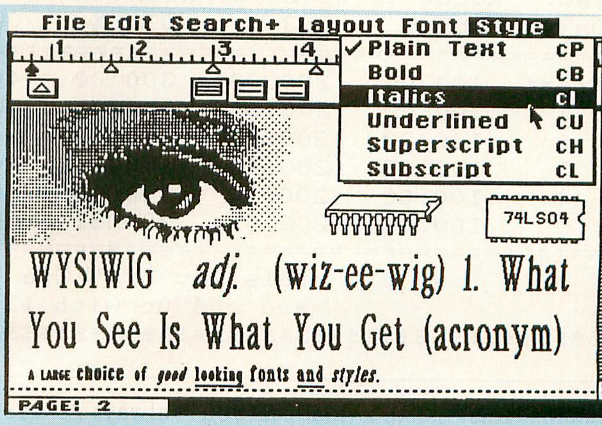
PUBLISHING

COLORWARE

Max-10™



WYSIWIG *adj.* (wiz-ee-wig) 1. What You See Is What You Get (acronym)

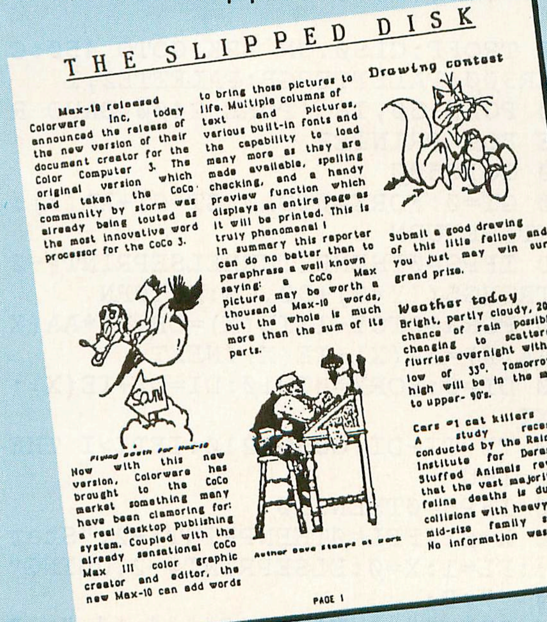
A LARGE **choice** of *good* looking fonts and *styles.*

THE DAZZLING WORD PROCESSOR

You probably already have a word processor, and you probably wish it had these features:

- Fully menu driven (CoCo Max style) with point and click marking of text. You don't need the arrow keys!
- True WYSIWYG (What You See Is What You Get) including variable size fonts, styles (bold, italics, etc.) and graphics.
- Can print multiple columns on a page.
- Not limited by printer capabilities: fonts up to 24 points (1/3") high, superscripts, small print, etc.
- Fully integrated spelling checker (incredibly fast), no need to exit program to check spelling.
- Graphics can be imported from just about anything (CoCo Max; MGE; BASIC; even Macintosh pictures from a BBS) and resized to fit your document.
- Full screen preview including graphics.

Max-10 has all these unique features, plus all the features you are used to in your current word processor. Even with all this, you don't give up anything. **Max-10** is easier to use, more intuitive, faster and more powerful than anything else. It's not just a word processor, it's a desktop publisher.



THE SLIPPED DISK

Max-10 released
Colorware Inc, today announced the release of the new version of their document creator for the Color Computer 3. The original version which had taken the CoCo community by storm was already being touted as the most innovative word processor for the CoCo 3.

Flying south for Max-10

Now with this new version, Colorware has brought to the CoCo market something many have been clamoring for: a real desktop publishing system. Coupled with the already sensational CoCo Max III color graphic creator and editor, the new Max-10 can add words to bring those pictures to life. Multiple columns of text and pictures, various built-in fonts and the capability to load many more as they are made available, spelling checking, and a handy preview function which displays an entire page as it will be printed. This is truly phenomenal !
In summary this reporter can do no better than to paraphrase a well known saying: a CoCo Max picture may be worth a thousand Max-10 words, but the whole is much more than the sum of its parts.

Author Dave Stamps at work

Drawing contest
Submit a good drawing of this litle fellow and you just may win our grand prize.

Weather today
Bright, partly cloudy, 20% chance of rain possibly changing to scattered flurries overnight with a low of 33°. Tomorrow's high will be in the mid- to upper- 90's.

Cars #1 cat killers
A study recently conducted by the Rainbow Institute for Deranged Stuffed Animals reveals that the vast majority of feline deaths is due to collisions with heavy mid-size family sedans. No information was made

PAGE 1

Max–10: $79.95

CoCo Max III owners: deduct $10

Max–10 requires a CoCo 3, at least 1 disk, & joystick or mouse

Printer drivers included: IBM/Epson and compatibles; DMP 105, DMP106, DMP130; CGP220 (B&W); Gemini/Star

Some of the many features of **Max–10:**
– Blinding speed – printing in multiple columns – online dictionary – spell checking – graphics can be mixed with text – full justification of proportionally sized characters – bold, italic, underline superscript and subscript type styles – superb file support, just point and click – "Undo" lets you correct mistakes – easy to use, no commands to remember – any graphics program can be used – pictures can be shrunk or stretched to fit – right and left alignment – centering – variable line spacing – page numbering – current page number displayed on the screen – variable tab stops – left and right margins – tabs and margins can vary in the same document – cut and paste text and graphics anywhere in the file – page break shows on the screen – pull down menus are quick and simple to use – lightning fast access to any point in the document with the scroll box – twenty fonts (styles and sizes), more available – any number of character sizes and styles can be mixed on the same line – up to more than 120 characters per line, depending on font size, style and letters – headers and footers, even with graphics – file compatibility with other word processors – right, left, bottom and top margins – word wrap – set starting page – type ahead – key repeat – key click – scroll up and down – ASCII file output for compatibility – disk directory – kill files– block cut, copy and move – global search and replace – paragraph indent – clipboard – merge – show file (on disk) – free memory display – page count – paragraph count – word count – graphics can be resized and moved – multiple fonts – error recovery – true lowercase – 512K memory support (all features work with 128K too) – complete point and click cursor control – moving, clearing and changing blocks of text is ridiculously easy, just point and click at each end of the text block – onscreen ruler – preview file before loading – search and replace – disk is not copy protected – more than 35 pages of text

CoCo Max III and Max–10 Perfect Together

You do not *need* **CoCo Max III** to insert and print graphics in **Max–10**. Max–10 works with any graphics creation program, and you can also use graphics downloaded from bulletin boards.

Similarly, you do not *need* **Max–10** to create graphics with text in **CoCo Max III**. There are tremendous lettering capabilities in **CoCo Max III**, with its many fonts, styles, and sizes.

Together **Max–10** and **CoCo Max III** are an unbeatable combination. This desktop publishing system is better than anything you've ever seen on a CoCo. We are so confident that you will use, and enjoy using the two software packages, that we offer an unconditional money back guarantee. Stop wasting your time and effort using inferior or obsolete products. Move up to the new generation of CoCo software now.

```
                         Lil' Ole Person's GOLDPILE
                         for THE COCO III on 12/12/88.
$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$
  No.   Accnt 1   Accnt 2   Accnt 3   Accnt 4   Accnt 5   Today's   Accumltd   Grand
 Days   .055 %    .063 %    .075 %    .098 %    .054 %    Interest  Interest   Total
==============================================================================
Start   100.00    200.00    300.00    400.00    500.00    0.0000        0.00   1500.00
  1     100.02    200.03    300.06    400.11    500.07    0.2926        0.29   1500.29
  2     100.03    200.07    300.12    400.21    500.15    0.2927        0.59   1500.59
  3     100.05    200.10    300.18    400.32    500.22    0.2927        0.88   1500.88
  4     100.06    200.14    300.25    400.43    500.30    0.2928        1.17   1501.17
  5     100.08    200.17    300.31    400.54    500.37    0.2928        1.46   1501.46
==============================================================================
                this way Lil' Ole THE COCO III can earn        $1.46
                and end up with $1,501.46 in just 5 days.
$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$
```

may change this POKE to a value that you use or just modify it to a BASIC REMark statement.

- Line 960 contains the famous speed-up POKE. If your CoCo 3 cannot execute at the fast speed or if you are using the program with a print spooler, change line 960 to a RETURN. If you do not modify this statement, be sure to always POKE65496,0 before you access the cassette or disk.

- Program lines 1020 through 1060 are the appropriate DMP-132 printer codes to force it to skip to the top of the paper form, print in different fonts (depending on how many accounts are processed) and sound the printer's bell when the printout is complete. If you are not using a DMP-132 printer you will have to modify these lines according to your printer's requirements or you may just change the lines to the BASIC RETURN statement.

Happy Saving!

(Questions or comments regarding this program may be directed to the author at P.O. Box 241, Shelbyville, IN 46176. Please enclose an SASE when requesting a reply.) ☐

```
160.....154  690.....192
300 .....13  830.....101
400 ......2  940 .....65
500.....163  END ....23
610 .....28
```

The Listing: INTEREST

```
0 ' COPYRIGHT 1989  FALSOFT,INC
10 '$$$$$$$$$$$$$$$$$$$$$$$$$$$
$
20 '$ LIL OLE PERSON'S GOLDPILE
$
30 '$   FOR 16K COCO WITH ECB
$
40 '$ (C)1983 BY: F. KALINOWSKI
$
50 '$      16 N. ALDER DRIVE
$
60 '$      ORLANDO, FL 32807
$
70 '$$$$$$$$$$$$$$$$$$$$$$$$$$$
$
80 '
90 '
100 '$$$$$$$$$$$$$$$$$$$$$$$$$$
$$
110 '$ FIRST APPEARED IN RAINBOW
 $
120 '$    SEPTEMBER 1984, PAGE 51
 $
130 '$ MODIFIED FOR THE COCO III
 $
140 '$       BY: DUKE NORRIS
 $
150 '$        P.O. BOX 241,
 $
160 '$   SHELBYVILLE, IN 46176
 $
170 '$$$$$$$$$$$$$$$$$$$$$$$$$$
$$
180 TROFF:CLS0:ON BRK GOTO 450:C
LEAR300:PALETTERGB:PALETTE2,1
190 POKE150,18 'POKE 2400 BAUD R
ATE FOR PRINTER
200 GOTO500
210 GT=0:FORX=0TO10:GT=GT+AA(X):
NEXT:RETURN
220 IFPS=0THENRETURNELSEPRINT#-2
,STRING$((Y*9)+32,C):RETURN
230 FORX=0TOY-1:IE(X)=DR(X)*AA(X
):AA(X)=AA(X)+IE(X):NEXT
240 DI=0:FORX=0TO10:DI=DI+IE(X):
NEXT
250 TI=TI+DI:GOSUB210:IFTI>I THE
N I=I+U
260 IFPS=0THEN310
270 X=0:IFFL=0THENPRINT#-2,"Star
t";:FL=1:X=0:ELSEPRINT#-2,USING"
###   ";D;
280 PRINT#-2,USING"#####.## ";AA
(X);
290 X=X+1:IF X<Y THEN280
300 PRINT#-2,USING" ##.#### ";DI
```

```
;:PRINT#-2,USING"#####.##  ";TI;
:PRINT#-2,USING"#####.##";GT
310 LOCATE0,04:Q$="Day ###":GOSU
B930:PRINTTAB(WA)"";:PRINTUSING
Q$;D:LOCATE0,06:Q$="Grand Total
   $$#,###,###.##  ":GOSUB930:PR
INTTAB(WA)"";:PRINTUSING Q$;GT
320 LOCATE0,08:Q$="Daily Interes
t $$#,###,###.####":GOSUB930:PRI
NTTAB(WA)"";:PRINTUSING Q$;DI:LO
CATE0,10:Q$="Total Interest $$#,
###,###.##  ":GOSUB930:PRINTTAB(
WA)"";:PRINTUSING Q$;TI
330 D=D+1:IFD<DD+1THEN230ELSED=D
-1
340 IFPT<8THENPT=8
350 C=61:GOSUB220
360 LOCATE0,13:ATTR5,2:PRINTSTRI
NG$(80,32):LOCATE0,14:Q$="This w
ay, Lil' Ole "+A$:ATTR5,2:GOSUB9
20:Q$="can earn: $$#,###.## Tota
l Interest":GOSUB930:LOCATE0,15:
PRINTTAB(WA)"";:PRINTUSING Q$;TI
370 IFPS=0THEN400
380 PRINT#-2,TAB(PT-8)"this way
Lil' Ole "A$" can earn ";:PRINT#
-2,USING"$$#,###.##";TI
390 PRINT#-2,TAB(PT-8)"and end u
p with ";:PRINT#-2,USING"$$,###.
##";GT;:PRINT#-2," in just"D"day
s."
400 LOCATE0,16:Q$="and end up wi
th at least: $$###,###.##":GOSUB
930:PRINTTAB(WA)"";:PRINTUSING Q
$;GT:LOCATE0,17:PRINTSTRING$(79,
32):LOCATE0,17:Q$="in just"+STR$
(D)+" days.":GOSUB920
410 C=36:GOSUB220:IFPS=0THEN430
420 FORX=1TO4:PRINT#-2:NEXT:GOSU
B1060
430 PRINT:GOSUB950:LOCATE0,22:Q$
="Want To Run More Accounts (Y/N
) ":ATTR4,5:GOSUB920:SOUND1,1
440 S$=INKEY$:IFS$="Y"THEN460ELS
EIFS$<>"N"THEN440
450 GOSUB970:GOSUB950:CLS5:END
460 FORX=0TO10:AA(X)=0:AN(X)=0:I
E(X)=0:IR(X)=0:NEXT
470 GOSUB970:ATTR3,2:Q$="Do You
Want A Printout (Y/N) ?":LOCATE
0,22::GOSUB920:SOUND1,1:S$=""
480 GOSUB950:S$=INKEY$:IFS$="Y"T
HEN PS=1:GOSUB970:GOSUB910 ELSE
IF S$=""THEN480 ELSE GOSUB960:PS
=0
490 D=0:TI=0::DI=0:IE=0:FL=0:C=2
2:W=0:CLS5:GOTO590
500 HSCREEN2:HCOLOR2,1:HCLS6:HW=
40:FORBN=0TO10:HPRINT(0,BN),STRI
NG$(40,"$"):NEXTBN:Q$="Lil' Ole"
:Q=12:GOSUB940
510 Q$="Person's":Q=14:GOSUB940
520 HCOLOR1,2:Q$="GOLDPILE":Q=16
:GOSUB940:HCOLOR2,1
530 GOSUB970:HCOLOR5,6:Q$="Do Yo
u Want A Printout (Y/N) ?":Q=18:
GOSUB940:SOUND1,1
540 S$=INKEY$:IFS$="N"THEN PS=0:
GOSUB960:GOTO550ELSEIFS$="Y"THEN
 PS=1:GOSUB970ELSE540
550 HCOLOR1,6:Q$="Screen Width 4
=40  8=80  (4/8) ?":SOUND1,1:Q=2
0:GOSUB940:SOUND1,1
560 S$=INKEY$:IFS$="4"THEN HS=40
 ELSE IF S$="8"THEN HS=80 ELSE G
OTO560
570 HCOLOR4,6:Q$="PRESS <SPACEBA
R> TO START.":Q=22:GOSUB940:SOUN
```

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NO HYPE! JUST QUALITY OS9
SOFTWARE AND HARDWARE

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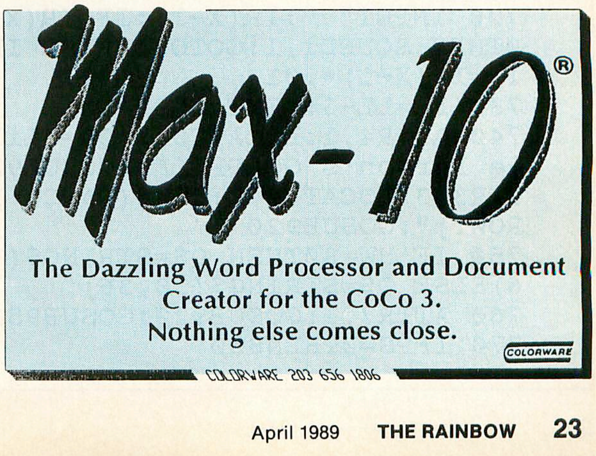
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The Dazzling Word Processor and Document Creator for the CoCo 3.
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```
D2,1
580 F=RND(7):IF F=6THEN580ELSE S
$=INKEY$:HCOLOR F,7:HPRINT(RND(8
0)-1,RND(11)-1),"$":IF S$<>" "TH
EN580 ELSE HW=HS
590 WIDTHHW:HSCREEN0:CLS5:ATTR4,
1:Q$="Lil' Ole Person's GOLDPILE
":LOCATE0,0:GOSUB920:IF HW=80 TH
EN Q$=STRING$(78,36)ELSE Q$=STRI
NG$(38,36)
600 ATTR3,3:LOCATE0,1:GOSUB920:G
OSUB950
610 IFPS=0THEN630
620 LOCATE0,3:Q$="What's The Sta
rt Date (MM/DD/YY)":GOSUB920:INP
UT" ";B$: IF B$=""THENSOUND1,1:C
LS5:GOTO590
630 LOCATE0,5:Q$="What's The Acc
ount Owner's Name":GOSUB920:INPU
T" ";A$:IF A$=""THEN SOUND1,1:GO
TO630
640 LOCATE0,8:Q$="How Many Accou
nts For Processing":GOSUB920
650 INPUT" ";Y:IFY<1ORY>11THENSO
UND1,1:LOCATE0,8:PRINTSTRING$(16
0," "):GOTO640ELSE IF PS=1THEN G
OSUB910
660 IF PS=1 THEN IF Y<6THEN GOSU
B1030 ELSE IF Y>5 AND Y<8 THEN G
OSUB1040 ELSE IF Y>7 THEN GOSUB1
050
670 LOCATE0,11:Q$="How Many Comp
ounding Days":GOSUB920:INPUT" ";
DD$:DD=VAL(DD$):IF DD=0 OR DD>36
50 THEN LOCATE0,11:PRINTSTRING$(
160,32):SOUND1,1:GOTO670
680 LL=15:FORX=1TOY:LOCATE0,LL:P
RINTSTRING$(160," "):IF HW=80THE
NLOCATE0,LL+3:PRINTSTRING$(160,"
 ")
690 LOCATE0,LL:Q$="Account"+STR$
(X)+" Starting Amount ($$.$$)":G
OSUB920
700 INPUT" ";AA(X-1):IF AA(X-1)=
0THEN SOUND1,1:GOTO690 ELSE LL=L
L+3
710 LOCATE0,LL:Q$="Account"+STR$
(X)+" Interest Rate (00.0000)":G
OSUB920
720 INPUT" ";IR(X-1):IF IR(X-1)=
0THEN SOUND1,1:GOTO710ELSE IR(X-
1)=IR(X-1)*.01
730 LL=LL-3:NEXT:CLS5
740 ATTR4,1:LOCATE0,0:Q$="Lil' O
le Person's GOLDPILE":GOSUB920:A
TTR3,3:LOCATE0,1:Q$="(WATCH IT G
ROW!)":GOSUB920
750 IF HW=80THEN Q$=STRING$(78,3
6)ELSE Q$=STRING$(38,36)
760 ATTR7,1:GOSUB920:GOSUB950
770 IFPS=0THEN880
780 PT=INT((Y*9)+6)/2
790 PRINT#-2,TAB(PT-1)"Lil' Ole
Person's GOLDPILE"
800 PRINT#-2,TAB(PT-1)"for "A$"
on "B$"."
810 C=36:GOSUB220:PRINT#-2," No.
";:X=1:FORT=6TOY*9STEP9
820 PRINT#-2,TAB(T)"Accnt"X;:X=X
+1:NEXT
830 PRINT#-2,TAB(T)"Today's";TAB
(T+9)"Accumltd";TAB(T+19)"Grand"
840 PRINT#-2,"Days";:X=0:FORT=5T
OY*9STEP9
850 PRINT#-2,TAB(T)IR(X)"%";:X=X
+1:NEXT
860 PRINT#-2,TAB(T+1)"Interest I
nterest";TAB(T+20)"Total"
870 C=61:GOSUB220
880 FORX=0TOY-1:DR(X)=IR(X)/365:
NEXT:GOSUB210
890 U=INT(GT/4400):IFU<1THENU=1
900 I=U:GOTO260
910 LOCATE0,22:IF(PEEK(&HFF22)AN
D1)THEN HCOLOR4,6:Q=22:Q$="PRINT
ER NOT READY":GOSUB920:GOTO910 E
LSE GOSUB1020:LOCATE0,22:PRINTST
RING$(78," ");:RETURN
920 IFLEN(Q$)> HW THENRETURNELSE
PRINTTAB((HW/2)-(LEN(Q$)/2));Q$:
RETURN
'CENTERIT
930 IFLEN(Q$)> HW THENRETURNELSE
 WA=((HW/2)-(LEN(Q$)/2)):RETURN
940 IFLEN(Q$)> HW THENRETURNELSE
 QQ=(HW/2)-(LEN(Q$)/2):HPRINT(QQ
,Q),Q$:RETURN
950 ATTR0,4:RETURN
960 POKE65497,0:RETURN 'SPEED-UP
970 POKE65496,0:RETURN 'SLOW-DOW
N
980 '
990 'ALL PRINT CODES ARE FOR A
DMP-132
1000 'CHANGE TO RETURNS IF NOT
      WANTED OR CHANGE THE CHR$
      CODES
1010 '
1020 PRINT#-2,CHR$(12):RETURN
 'SKIP TO TOP-OF-FORM
1030 PRINT#-2,CHR$(27);CHR$(18):
RETURN
 'CORRESPONDENCE-10
1040 PRINT#-2,CHR$(27);CHR$(29):
RETURN
 'CORRESPONDENCE-12
1050 PRINT#-2,CHR$(27);CHR$(77):
RETURN
 'MICROFONT
1060 PRINT#-2,CHR$(7):RETURN
 'SOUND PRINTER BELL END-OF-PRIN
T OPERATION
```

"In the beginning there was VIP Writer and users saw that it was good, But it's not the best anymore. There's a new word processor to claim the crown...
***VIP Writer III** –Setting the Standard"* —RAINBOW SEPT. 1988

MORE SCREEN DISPLAY OPTIONS

VIP Writer III offers screen widths of 32, 40, 64 & 80 - all with 24 lines and actual lower case letters using the CoCo 3's hardware display. It runs at double clock speed and has 4-color menus making VIP Writer III FAST and EASY to use! You can choose foreground, background, hilite and cursor colors from up to 64 hues. Color can be turned ON or OFF for the best possible display using a monochrome monitor or TV set. VIP Writer III has a context sensitive help facility to display command usage in easy to read colored windows.

CUSTOMIZER & PRINTER INSTALLER

VIP Writer III comes with a configuration / printer installation program which lets you customize VIP Writer III to suit your own liking. You can set screen width and colors as well as margins and more. You can also install your own printer and set interface type (serial, parallel or J&M), baud rate, line feeds, etc. Once done, you never have to enter these parameters again! VIP Writer III will load n' go with your custom configuration every time!

MORE TOTAL TEXT STORAGE

VIP Writer III has 106K total text storage in a 128K CoCo 3 (495K in 512K). VIP Writer III creates ASCII text files which are compatible with all other VIP Programs as well as other programs which use ASCII files. You can use VIP Writer III to even type BASIC programs! There is a 48K text buffer (438K in a 512K CoCo 3) and disk file linking allowing virtually unlimited text space. VIP Writer III works with up to four disk drives and lets you display directories and free space as well as rename or kill disk files. In addition VIP Writer III is 100% compatible with the RGB Computer Systems Hard Disk.

POWERFUL EDITING FEATURES

VIP Writer III has a full featured screen editor which can be used to edit text with lines up to 240 characters long with or without automatic word wrap around. You can select type-over mode or insert mode. There is even an OOPS command to recall a cleared text buffer. Other editing features include: Type-ahead • typamatic key repeat and key beep for flawless text entry • end of line bell • full four way cursor control with scrolling • top of textfile • bottom of textfile • page up • page down • top of screen • bottom of screen • beginning of line • end of line • left one word • right one word • DELETE character, to beginning or end of line, word to the left or right, or entire line • INSERT character or line • LOCATE and/or CHANGE or DELETE single or multiple occurrence using wildcards • BLOCK copy, move or delete with up to TEN simultaneous block manipulations • TAB key and programmable tab stops • word count • line restore • three PROGRAMMABLE FUNCTIONS to perform tasks such as auto column creation and multiple copy printing.

Writer III or Library /W owners: Upgrade to the VIP Writer III 2.0 for $10 + $3 S/H. Send ORIGINAL disk and $13 total.

AUTOMATIC TEXT FORMATTING

VIP Writer III automatically formats your text for you or allows you to format your text in any way you wish. You can change the top, bottom, left or right margin and page length. You can set your text flush left, center or flush right. You can turn right hand justification on or off. You can have headers, footers, page numbers and TWO auxiliary lines which can appear on odd, even or all pages. You can also select the line on which they appear! You can even change the line spacing! Parameters can be altered ANYWHERE !

PREVIEW PRINT FORMAT WINDOW

VIP Writer III features an exclusive format window which allows you to preview your document BEFORE PRINTING IT! You are able to move up, down, left and right to see centered and justified text, margins, page breaks, broken paragraphs, orphan lines etc.

PRINTING VERSATILITY

VIP Writer III prints TWICE as fast as any other CoCo word processor! It supports most serial or parallel printers using J&M JFD-CP or Rainbow interface and gives you the ability to select baud rates from 110 to 19,200. You can imbed printer control codes anywhere in your text file EVEN WITHIN JUSTIFIED TEXT! VIP Writer III also has TWENTY programmable printer macros which allow you to easily control all of your printers capabilities such as bold, underline, italics and superscript using simple key strokes. Other features include: multiple copy printing • single sheet pause • line feeds.

BUILT IN PRINT SPOOLING

VIP Writer III has a print spooler with a 57,000 character buffer which allows you to print one document WHILE you are editing another. You don't have to wait until your printer is done before starting another job! Some word processors DO NOT include this feature!

50,000 WORD SPELLING CHECKER

VIP Writer III includes VIP Speller (not FREEWARE) to check your text for misspelled words It has a 50,000 (not 20,000) word dictionary that can be added to or edited.

QUALITY DOCUMENTATION

VIP Writer III comes with a well written 125 page manual which is Laser printed, not dot-matrix like the competition. It includes a tutorial, glossary of terms and examples for the beginner as well as a complete index! VIP Writer III is truly the BEST you can buy.

VIP Writer III includes VIP Speller 1.1. **DISK $79.95**

Available through Radio Shack Express Order Cat. #900-0908

VIP Writer owners: Upgrade to the Writer III 2.0 for $49.95 + $3 S/H. Send original disk and $52.95 total.

VIP Database III

VIP Database III features selectable screen displays of 40, 64 or 80 characters by 24 lines with choice of 64 foreground, background, hilite and cursor colors for EASY DATA ENTRY. It uses the CoCo 3's hardware screen and double clock speed to be the FASTEST database available! VIP Database III will handle as many records as will fit on your disks and is structured in a simple and easy to understand menu system with full prompting for easy operation. Your data is stored in records of your own design. All files are fully indexed for speed and efficiency. IN-MEMORY SORT of records is LIGHTNING FAST and provides for easy listing of names, figures, addresses, etc., in ascending or descending alphabetical or numeric order. Records can be searched for specific entries using multiple search criteria. The built-in mail-merge lets you sort and print mailing lists, print form letters, address envelopes - the list is endless. The built-in MATH PACKAGE even performs arithmetic operations and updates other fields. VIP Database III also has a print spooler and report generator which uses print forms you create. **DISK $69.95**

Available through Radio Shack Express Order Cat. #900-0915

VIP Database owners: Upgrade to the VIP Database III for $39.95 + $3 S/H. Send ORIGINAL disk and $42.95 total.

VIP Library /WDCE

The VIP Library /WDCE combines all six popular VIP application programs - VIP Database III, VIP Writer III, VIP Speller, VIP Calc III, VIP Terminal and VIP Disk-ZAP - into one integrated program on one disk called VIP Desktop. **DISK $179.95**
For VIP Library shipping please add $4 USA. $5 Canada. $10 Foreign.

VIP Library owners: Upgrade to the VIP Library /WDCE for $99.95 + $3 S/H. Send ORIGINAL disk and $102.95 total.

VIP Library /WDE owners: Upgrade to the VIP Library /WDCE for $10 + $3 S/H. Send ORIGINAL disk and $13 total.

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We accept VISA / MASTERCARD and C.O.D. orders by phone.
Non VIP Library orders add $3 for shipping and handling in USA. Canada $4. Foreign $6. COD orders add an additional $2.75. Checks allow 3 weeks for delivery.

VIP Calc III

FAST 4-color POPUP menus • PRINT SPOOLER 32, 40, 64 and 80 Column HARDWARE display! Runs VERY VERY FAST at double clock speed!

Now every CoCo 3 owner has access to a calculating and planning tool better than VisiCalc™, containing all its features and commands and then some. VIP Calc III allows a large worksheet with up to 512 columns by 1024 rows! In addition, VIP Calc III has up to 16 windows which allow you to compare and contrast results of changes. Other features include 8 AND 16 digit precision • trig. functions • averaging • algebraic functions • column and row ascending and descending SORTS • locate formulas or titles in cells • block move and replicate • global or local column width • limitless programmable functions • create BAR charts. Embed printer control codes for customized printing. Combine spreadsheet data with VIP Writer documents to create ledgers, projections, statistical & financial budgets and reports. **DISK $69.95**

Available through Radio Shack Express Order Cat. #900-0916

VIP Calc owners: Upgrade to the VIP Calc III for $29.95 + $3 S/H. Send original disk and $32.95 total.

Buy RGB-DOS for $29.95,

Get Hard Disk support, new commands and a Disk Drive FREE!*

Sounds too good to be true? If you own a Radio Shack FD 502 or other double sided Disk Drive, using RGB-DOS, you can access the other side of your Disk Drive giving a second disk drive absolutely free!* RGB-DOS also supports up to 2 Hard Drives that can be used by DISK BASIC as well as OS-9. RGB-DOS works with CoCo 1, 2 and 3 and supports double sided drives and faster stepping rates. Other features include: Full screen directory display shows drive #, free space and even a disk name! • RUNM command and FLEXIKEY Last Command Recall and Edit system • EPROM version executes any program when CoCo is turned on for hands free start-up. 64K Req'd.

All products run under RSDOS and are not copy protected.

A comparative-look at the various word processors available on the CoCo market

Deciding What's Write for You

Choosing a word processor will probably be the most important and difficult software decision you make in your computing life. You had better choose well, because if you're a typical user, the word processor will become the most-used program in your software collection. There is a wide variety of word processors on the CoCo market. Some are relatively expensive, some dirt cheap — but all handle the basic features of disk or tape I/O, etc. The decision will be based on the features you want — a spelling checker, table of contents generator, large buffer size, etc. Be sure to take some time and give a lot of thought to the one you select, because word processors are not like games; you do not buy a new one every month. And once you invest the time it takes to thoroughly learn a system and grow comfortable with it, you are not likely going to want to change. You'll have to live with it for a long time, and you'll grow to love it.

When it comes to word processors, people tend to be rather subjective. Here at Falsoft, we use Tandy's MS-DOS computers for production because our typesetting system is set up to work with them. Which means, of course, that for production we use MS-DOS word processors. Managing Editor Jutta Kapfhammer's favorite MS-DOS word processor is *Telecommuter.* Technical Editor Cray Augsburg's favorite is *WordStar 2000.* Reviews Editor Lauren Willoughby favors *XyWrite III Plus.* Lonnie's favorite (you all know who he is, right?) is *WordPerfect* 5.0.

Because we are moving to a new typesetting system (Linotype) that is geared toward total electronic publishing, it has been decided that the editorial department standardize on word processors, using only one for production. And guess whose personal preference it is that we are all adopting? You guessed it — Lonnie's! In less than a week, we are all supposed to be editing and generating copy on *WordPerfect* 5.0. As you can probably tell, we are not at all thrilled with the idea. As a matter of fact, some of us will make the change kicking and screaming all the way. You see, word processors are personal kinds of things. You get very attached to the one you've been using. It's like getting accustomed to and driving what you feel is a Ferrari for years and one morning finding a Cadillac in your driveway. Cadillacs are nice, but . . .

Sorry, back to personal preferences and the CoCo.

Cray's personal favorite in the CoCo realm is *Simply Better*, a new CoCo 3 word processor that is a little like *VIP Writer III* Version 1. It lets you do all sorts of neat things — including sorts! Jutta's personal favorite is *Telewriter-64*, which lets her accomplish writing and editing tasks with menu-driven ease. And Lauren favors *VIP Writer III*, especially the new Version 2, because of its speedy command-driven operation and its new backspace key.

In a review a few months ago, Lauren sang the praises of *VIP WriterIII* to the high heavens, even going so far as to say that it was "setting the standard for CoCo 3 word processing." That may or may not be true, but it should be noted that she was under the influence of subjectivitis. (Actually, *Telewriter-128* for the CoCo 3 came out about the same time as *VIPWriter III*, and the two are pretty much neck-and-neck with performance and operation — except that *Telewriter-128* is menu-driven — so maybe *it* set the standard.) If she stepped on some toes, she apologizes. We all are guilty of favoritism.

Here on the staff we've driven the various word processors around the block, but we hadn't taken them out on a road trip. Now that we have, here is a revelation, the most important thing we've learned in life: *At the baseline, all word processors are pretty much alike.*

All word processors let you type in text, edit it, store it, print it, call it back up and delete it. Primarily, the ability to save text is what makes word processors so wonderful.

In light of this revelation, we are going to have to amend our reviews editor's brash proclamation of *VIP* as the be-all and end-all of CoCo word processors. Now that we have test-driven all these programs, we are thoroughly confused. So, if you're reading this to find out what's the absolute best word processor available, you won't find that answer here. First you have to ask yourself what kind of person you are, and then you'll know which word processor is right for you. (More on this later.)

What Can You Do With Them?

If you've read this far wondering what all the fuss was about, and you have no earthly idea what a word processor is, where have you been? No doubt most of you already know what a word processor is. Maybe word processing is the reason you purchased your Color Computer in the first place. Simply, very simply, a word processor is like a magic typewriter that lets you change what you type after you type it. Then it lets you print out what you typed — as many times as you want. No more duplication of effort.

It gives you a way to come clean, at least with copy. If your handwriting is lousy and your typing is worse, word processors are the only way to go! It doesn't matter how badly you type, because you can always *re*type. And retype and retype until you get it right — but only the part you keep messing up. Never again will you have to key in the same information over and over. Your word processor (provided you have a storage device such as a cassette recorder or a disk drive) can store your work for you and spit it out on demand.

Word processors are the ultimate writing tools, and they are flexible. You can write novels, research papers and letters, or you could use them merely to automate your grocery list-making process. You can leave notes to yourself in a file that you call up every day. Because all a word processor does is store information.

Would You Believe . . . a "Wordbase"?

Databases are designed to store information, but they are structured so that you have to know exactly what kind of information you're going to fill them with before you get around to entering any. Reviews Editor Lauren Willoughby uses her word processor as a "free-form" database all the time, and she says the "search" part of the universal search-and-replace feature serves her better than a standard database. She knows this because she's tried databases, both of the MS-DOS variety and the CoCo kind, and using the word processor is faster for her.

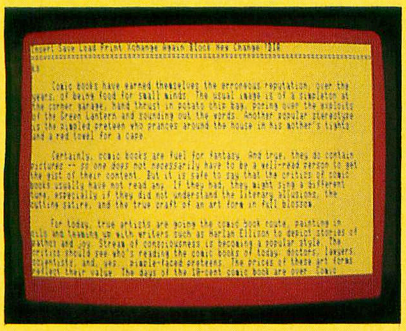
As reviews editor, she has to keep track of reviewers and their assorted equipment. If the information were kept in a database, there'd have to be at least 40 fields to contain it. But most reviewers do not have 40 pieces of equipment — say, 10 things on a list of 40, at the most. So when entering data on her reviewers, she'd be entering a lot of "no"s in fields pertaining to equipment they do not have.

Instead, all the reviewers are kept in an ASCII file. Lauren merely types the name of the reviewer, then just types the equipment that he or she *does* have (and if this gets tedious, macros can be called upon to type in repetitive material — to type in "modem" every time ALT-M is pressed, for example). If she needs to find a reviewer who has a modem, she goes to the top of the file and initiates

---

CoCo 3 Word Processors

*Elite*Word/80*



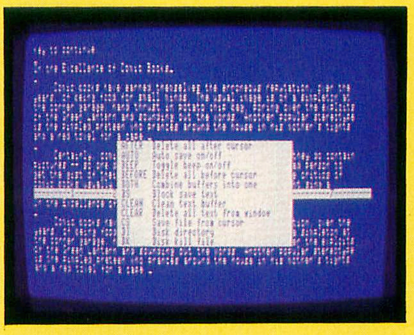
Advantages: It is a mature, easy-to-learn word processor with a suitable range of commands. All the options available are at the top of the screen in a command line. There is mail merge and support for the 512K CoCo 3.

Disadvantages: It lacks some of the "new" word processing features such as print spooling and auto-saving. The spelling checker is not included with the package, but is available separately.

CoCoNutshell: It makes a good word processor for business and school use, and is easy to learn. The ever-present menu interface should make it simple even for a child to use.

For more information, see the review in March 1987's RAINBOW, *Page 134.*

Simply Better



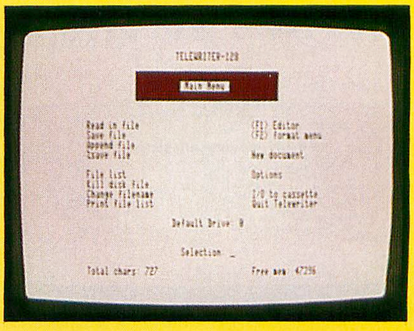
Advantages: It's got features, speed and ease of use. It can do sorts, line numbering, mail merge, and even generate an index and table of contents. There are "tasks," or macros, that can automate a lot of your work.

Disadvantages: There is no supplied spelling checker, though it can work with generic spelling checkers that accept ASCII files. There is no backspace key.

CoCoNutshell: With all its features, it is ideal for the word processing power user. It's also good for anybody else. It's simple to learn, yet the power is there for those who wish to delve deeper. Business users will appreciate mail merge and forms fill-in.

For more information, see the review in this issue of THE RAINBOW, *Page 134.*

Telewriter-128



Advantages: The extensive use of dialog boxes and windows results in very clean, efficient and smooth operation. A Help screen is available, and documents can be previewed onscreen. There are 26 macros that can each be used to store up to 127 characters of often-used text. There is also a conversion program that lets *TW-64* `.BIN` files work on *TW-128*.

Disadvantages: There is neither mail merge nor a spelling checker, but any ASCII-based spelling checker should work.

CoCoNutshell: It is a full-blown word processor, offering virtually all the features you would expect to need for most applications.

For more information, see the review in May 1988's RAINBOW, *Page 133.*

a search for the text string "modem." The word processor will then zip through every occurrence of the word.

Granted, this procedure might get a little tedious if there were thousands of reviewers to keep track of — a database might be the best bet then — however, there are only about 100. But one thing traditional databases will let you do that you cannot replicate in a word processor is print out lists of indexed items.

Outward Bound

In conjunction with a desktop publishing program, a word processor lets you build your own typesetting operation. Yes, many desktop publishing programs are designed to let you generate copy (like *CoCo Newsroom*), but it is infinitely easier to prepare the text in a program that was designed for preparing text, then import the file into the desktop publishing program (as *Home Publisher* recommends you do). Desktop publishers are designed to coordinate text and graphics in a pleasing combination.

You can create family or club newsletters with your word processor alone, but if you want to get fancy with fonts and the like, you really need a desktop publisher. If it's got to do with the dissemination of information of any kind whatsoever — whether it's a club bulletin, a song, a newscast, a novel, a play, a movie, etc. — chances are very likely that at one time it was just a collection of thoughts typed into a computer keyboard and stored in a word processing file.

Getting Technical

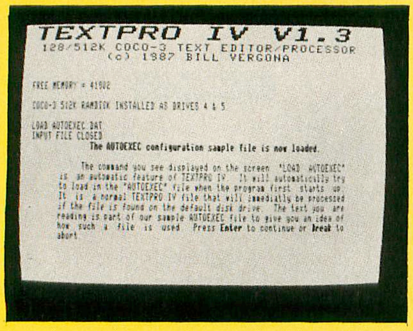
You can even program with word processors! If BASIC's `EDIT` feature leaves you wanting more editing abilities, try typing in and editing your programs in your word processor. You must first convert the binary file into ASCII (`SAVE"`*filename*`",A`) before you can import the file, though.

One of the first uses Technical Editor Cray Augsburg found for his word processor was creating return address labels. Using programmable tasks, it was a simple matter to enter his name and address just one time and print as many labels as needed. He would set the top margin to zero and the bottom margin and page length to 6 for use with 1-inch labels, making sure the text was centered in a six-line range and the function was programmed to print a single label. When asked for the number of times the task was to be executed, he just entered the number of labels he wanted. During the holidays, he adds a season's greetings message in a special font.

Programming is another area in which Cray uses his word processor. Full-screen editing makes it a breeze to enter and edit programs. And the global search and replace feature sure helps when you want to change all those `PRINT` statements to `PRINT#-2`. Also, with the "auto-numbering" feature found in many new word processors, you don't have to enter the line numbers. The only drawback is that you have to exit the word processor to take the program on a test drive.

CoCo 3 Word Processors (continued)

TextPro IV



```
TEXTPRO IV V1.3
128/512K COCO-3 TEXT EDITOR/PROCESSOR
(c) 1987 BILL VERGONA

FREE MEMORY = 41902

COCO-3 512K RAMDISK INSTALLED AS DRIVES 4 & 5

LOAD AUTOEXEC.DAT
INPUT FILE CLOSED
          The AUTOEXEC configuration sample file is now loaded.

          The command you see displayed on the screen "LOAD AUTOEXEC"
     is an automatic feature of TEXTPRO IV.  It will automatically try
     to load in the "AUTOEXEC" file when the program first starts up.
     It is a normal TEXTPRO IV file that will immediatly be processed
     if the file is found on the default disk drive.  The text you are
     reading is part of our sample AUTOEXEC file to give you an idea of
     how such a file is used.  Press Enter to continue or Break to
     abort.
```

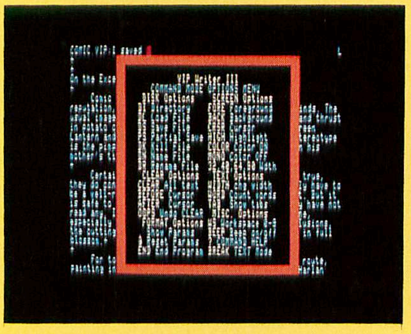
Advantages: It's a power user's dream come true. If we're talking features, this is the final word. It can display up to 212 columns by 24 lines, with onscreen display of bold, italics and underlining. It includes nine Hi-Res screen fonts and does mail merge.

Disadvantages: It works mainly as a line editor, so writing text can be tedious. There is an auto-line-numbering function, but even using that can be tedious. It is difficult to learn, and you have to think like a programmer.

CoCoNutshell: If you are a power-hungry user and don't mind entering your text as lines, then this would be the word processor for you. It makes a good editor for programming.

For more information, look for a review in an upcoming issue of THE RAINBOW.

VIP Writer III, V. 2



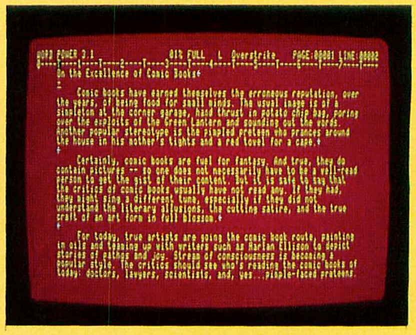
Advantages: It's fast and colorful. The native 80 columns make screen updates relatively speedy. The print spooler frees up the machine when you're printing long files. The addition of the backspace key makes cursor movement more intuitive. A help menu pops up over text when the user exits the text mode to go up to the command line.

Disadvantages: To get mail merge, you need *VIP Database*, a companion product.

CoCoNutshell: It's a good general-purpose word processor, fit for hardcore users and especially for users who also work with word processing on other machines. It is part of a library of companion programs.

For more information, see the review in this issue of THE RAINBOW, *Page 132.*

Word Power 3.2



```
WORD POWER 3.1              01% FULL  L  Overstrike   PAGE:00001 LINE:00002
     On the Excellence of Comic Books

          Comic books have earned themselves the erroneous reputation, over
     the years, of being food for small minds. The usual image is of a
     simpleton at the corner garage, hand thrust in potato chip bag, poring
     over the exploits of the Green Lantern and sounding out the words.
     Another popular stereotype is the pimpled preteen who prances around
     the house in his mother's tights and a red towel for a cape.

          Certainly, comic books are fuel for fantasy. And true, they do
     contain pictures -- so one does not necessarily have to be a well-read
     person to get the gist of their content. But it is safe to say that
     the critics of comic books usually have not read any. If they had,
     they might sing a different tune, especially if they did not
     understand the literary allusions, the cutting satire, and the true
     craft of an art form in full blossom.

          For today, true artists are going the comic book route, painting
     in oils and teaming up with writers such as Harlan Ellison to depict
     stories of pathos and joy. Stream of consciousness is becoming a
     popular style. The critics should see who's reading the comic books of
     today: doctors, lawyers, scientists, and, yes...pimple-faced preteens.
```

Advantages: It offers lots of features, incorporating pluses such as a calculator and a split-screen window. The initial menu is intuitive and is very easy to use. It offers a spelling checker and a style checker and supports 512K. The configuration program is simple to run.

Disadvantages: Text can be displayed at 80 columns only, which may cause eyestrain for people accustomed to the larger 40-column characters.

CoCoNutshell: Mail merge and the calculator make it an excellent word processor for business. Its ease of use and intuitive interface also make it good for a general-purpose word processor. Students will appreciate the spelling and style checkers.

For more information, see the review of WordPower *3.1 in October 1988's* RAINBOW, *Page 120.*

Telewriter-128™

the Color Computer 3 Word Processor

TELEWRITER: UNDISPUTED #1

If you've read the other word processor ads, you've probably had your fill of cold lists of features, and claims of ultimate speed, power, and ease of use. So let's try to get past the overblown claims and empty buzz words—with 2 simple facts:

Fact 1: Telewriter is undisputedly the #1 most popular word processor on the Tandy Color Computers.

Fact 2: Telewriter's exemplary ease of use and power have been acclaimed in numerous magazine reviews and in thousands of letters and calls from end users.

THE OTHERS DON'T UNDERSTAND

So why has Telewriter gained such a large and loyal following, while other Color Computer word processors have come and gone? Ironically, our competitors' ads tell you *exactly* why.

For them, word processing is nothing more than features and numbers. The longer the list of features, and the bigger the numbers, the better the word processor. Or so they think.

They just don't understand that power and ease of use are not gained by tacking on random features or throwing in freebie utilities or forcing you to use a cumbersome mouse.

Real Power, *true* Ease of Use, and *genuine* Speed can only be attained through thoughtful, logical, intelligent design, attention to detail, and a commitment to the act and the art of writing. That's the Telewriter tradition, and that's the reason for Telewriter's phenomenal success.

TELEWRITER—128: INTELLIGENT DESIGN PERFECTED

And now, Telewriter-128, the latest Telewriter, uses the added hardware power of the Color Computer 3 to bring this intelligent design to its logical perfection.

Telewriter-128 adds unsurpassed speed and important new features to the already impressive arsenal of Telewriter-64. Not just speed for speed's sake, or features for the sake of advertising—but speed where it counts and features that make you a more efficient, more effective writer.

Rainbow magazine put it this way: "Telewriter-128 will set the word processing standard for the Color Computer 3 because it is so simple and user friendly. . . . The 81-page tutorial/user's manual is nicely done. It is written in easy to understand language but the program itself is so easy. . . . Most people will be able to use the software right out of the package."

TELEWRITER-128 OR DESKTOP PUBLISHING

Desktop publishing is nice for adding pictures and fancy fonts to newsletters or business presentations—but its graphics orientation sacrifices some important capabilities when it comes to working with words.

If your main concern is expressing ideas through words (notes, letters, reports, papers, novels, etc.), the dedicated word processing power of Telewriter-128 still provides the most efficient tool for the job. Each tool has its place—desktop publishing for striking visuals, Telewriter-128, for effective writing.

TELEWRITER-128 OR TELEWRITER-64

You can no longer afford to be without the ease, power, and efficiency, that Telewriter brings to everything you write.

Telewriter-128 for the Color Computer 3 costs $79.95 on disk, $69.95 on cassette.

For the Color Computer 1&2, **Telewriter-64** costs $59.95 on disk, $49.95 on cassette.

To order by MasterCard or Visa,
call **(619) 755-1258** anytime, or send check to:

COGNITEC
704 Nob Avenue
Del Mar, CA 92014

(Add $2 S&H. Californians add 6% tax. To upgrade from TW-64 to TW-128 send original TW-64 disk and $41.95.)

Telewriter is also available through your nearby Radio Shack Computer Center and participating Radio Shack stores and dealers—or order direct from Express Order by dialing **1-800-321-3133.**

Ask for: **Telewriter-128** (disk) . . . cat #90-0909
Telewriter-64 (disk) . . . . cat #90-0254
Telewriter-64 (cass) . . . . cat #90-0253

FEATURES THAT MATTER: Telewriter's outstanding design and its complete set of features, put it in a class by itself, for smooth, efficient writing and letter perfect printed documents. Telewriter-128 includes:

Unbeatable SCREEN PERFORMANCE: lightning fast paging and scrolling, on-screen text that never lags behind your typing, and a response that is always instantaneous, no matter how much text is in the buffer, or where you are in the document.

26 User definable MACRO KEYS type your often used phrases and titles with a single keypress—saving you time and freeing your concentration for writing. User settable DUAL SPEED CURSOR moves you anywhere on the line, on the page, or in the document, fast or slow—you decide, with the touch of a finger. Fast PRINT PREVIEW MODE shows you text as it will print: headers, footers, margins, page breaks, page numbers, justification—saves time and paper and guarantees perfect looking documents everytime.

Instant, ON-LINE HELP summarizes all Telewriter-128 commands and special symbols. The Online OPTIONS MENU lets you instantly customize the writing environment at any time to suit your precise needs (Screen/character color, Monochrome on/off, Key repeat/delay rate, 2 Cursor repeat/delay rates, Case-sensitivity of search, Auto file backup on/off, and more). A SINGLE FUNCTION KEY takes you instantly to any menu, so you never have to stop and think.

The 24, 25 or 28 LINE SCREEN DISPLAY option lets you see 16% more on-screen text (28), or wider line spacing (25). The auto-loading OPTIONS FILE stores all your Macros, Print Format settings, and Options Menu settings, so they are always there everytime you run Telewriter-128. 3 pop-up STATUS WINDOWS tell you cursor position, word count, free space, etc.

The QUICK SAVE feature lets you instantly save your current document with just 2 keystrokes and without leaving the editor. CURSOR THROUGH DIRECTORY to Load, Append, Rename and Kill files—so you'll never type a filename after the first time. HANGING INDENTS help you organize ideas on the page more effectively. Also: Footers, Multiple Print, Print to Disk, Key Click, Key Repeat, 40/80 Column Option, Overstrike, Word Delete, Nested Macros, Definable Foreign and Math Symbols and more. . . .

And, of course, Telewriter-128 incorporates all the Features of TELEWRITER-64, like: Works with *absolutely any printer* that works with your Color Computer (1, 2, or 3). Uses simple Embedded Control Codes so *all* intelligent features of your printer are easily accessed, including: Underlining, Boldface, variable Fonts, Sub-script, Super-script, Italics etc.

Format commands allow dynamically changing Margins, Headers, Spacing, Centering, etc., anywhere in the document. Format menu sets Margins, Spacing, Page numbering, Baud rate, Lines per page, Justification. Chain Printing means the size of your printed document is unlimited. Also Single page and Partial Print.

Fast full-screen editor with wordwrap, text alignment, block copy/move/delete, global search and replace, wild card search, fast 4-way auto-repeat cursor, fast scrolling, forward and backward paging, settable tabs, word and line counter, full error protection. Insert or delete anywhere on screen. Simple, easy to remember, "mnemonic" Editor Commands. Load, Save, Append, Partial Save files to disk or cassette. Kill, rename and list disk files. ASCII file compatibility.

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A new generation of Color Computer products

MAXSOUND

RAINBOW CERTIFICATION SEAL

A High Quality Digital Audio Sampler and Sequencer

Turn your CoCo III into a REAL digital audio sampler with HIGH quality audio reproduction. Easily add exotic effects, ECHO, stuttering, speed shifting, sequencing, and reverse audio to BASIC or ML programs or GRAPHICS! Now includes Data Compression. Imagine recording any Voice, Music, or Sound effect and being able to use these DIGITAL recordings in your own programs! 3 disk sides includes: INTERFACT/BIN - ML driver for sound effects. G&M/BAS - Adds sound effects to Graphics. SHOWTIME and DEMO disks. SCOPE/BAS - Turns CRT into a Digital Oscilloscope to look at MAXSOUND waveforms. Version 3.0 upgrade (Includes improved ECHO and the ability to print NAMETAGS and locations to the screen and/or printer) ..... $6.95 + Shipping & Handling

"*Maxsound*...bringing a new era to the CoCo Community"
-Cray Augsburg, June '88 Rainbow Review

Call to hear 'OVER THE PHONE' Demo - 9am to 9pm VOICE only.
DOWNLOAD Demo Files 300/1200/2400 24 hrs - 301-675-7626 MODEM only.
Requirements .... (128k or 512k CoCo III only) DISK $59.95

Maxsound Soundtracks & Graphics

These exciting disks are samples of what can be created with MAXSOUND and CoCo Max III! These unbelievable soundstracks w/graphics DO NOT require the MAXSOUND program to run.

Airwolf	128k.....$5.95	War of the Worlds	512k.....$5.95
Knight Rider	128k.....$5.95	Warrior King Demo	512k.....$5.95
Startrek	128k.....$5.95	Probe	512k.....$5.95

NEW

5 in 1 Demo (Airwolf, Startrek, Knight Rider, Probe, Other World) 512k.....$9.95

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RAINBOW CERTIFICATION SEAL

Communicate with VAX, UNIX, Mainframe, and BBS Systems!

- **-VT-100, VT-52, Vidtex (includes RLE graphics display), and standard CRT emulations.**
- **-Developed and tested on a UNIX system using the EMACS and VI full-screen editors.**
- **-All 128 ASCII characters accessible from the keyboard.**
- **-Uses a high-resolution graphics screen to implement a highly readable 80-column screen.**
- **-Menus can be operated concurrently with other terminal functions. (Disk Basic!)**
- **-Full 28 line by 80 column screen, with 3 bottom lines protected for menus.**
- **-Serial port up to 2400 baud, RS-232 Pak up to 9600 baud, DCModem Pak at 300 baud.**
- **-XModem, XModem-CRC, Y-Modem, and ASCII file transfers directly to disk or memory.**
- **-Prints disk or buffer files with settable margins, baud rate and word wrap.**
- **-Full 128k or 512k support with a RAMDISK like buffer. Monochrome monitor support.**
- **-Capture buffer, Snapshot, Conference mode, 35/40/80 Tracks, and over 56 pages of docs!**

"...one of the most versatile and full featured terminal emulators for the CoCo 3."
-Bryan Gridley, November '88 Rainbow Review

Version 02.00.00 upgrade ...... $6.95 + S&H Disk (128k or 512k CoCo III only) $39.95

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A new generation of Color Computer products

NEW **TelePak +** (CoCo I/II/III) **A TRULY COMPATIBLE RS-232 INTERFACE!**

Now, from Orion Technologies, comes the answer to the continuing demand for an RS-232 interface. No compatibility hassles! Uses standard DB25 cable. Compatible with RS-DOS & OS-9 software. Baud rates up to 19,200! Enhances the Multi-tasking capabilities of the V-Term Terminal Emulator found on the opposite page. Only $49.95

CoCo Max III (CoCo III only)
THE BEST Graphics Package
See April '88 review. Disk ... $74.95

BOTH $129.95

MAX-10 + (CoCo III only)
THE DAZZLING Desktop Publisher
CM3 owners deduct $10. Disk ... $74.95

GRAPHICS-25 (512k CoCo III only) **Great with MAXSOUND and/or CoCo Max III!** Up to 25 ONBOARD HIRES SCREENS! Six new BASIC commands. Fast & Smooth Graphics animation. Save and Load graphics screens to and from disk. See September 1988 Rainbow review. Disk .. $19.95

MULTI-LABEL III (CoCo III only) See July '87 review. An easy to use, versatile label creating program including many new CoCo III features. Print multiple fonts on each label! This one's a MUST for the CoCo III!! Disk $16.95

FKEYS III (CoCo I/II/III) See April '87 review. A user friendly, programmable function key utility that creates up to 20 function keys. EDITOR, DOS mods, Single or Double sided, 35/40 tracks, DISABLE, and it's EPROMable!. Disk .. $19.95

SIXDRIVE (CoCo I/II/III) This machine language utility modifies DECB 1.0, 1.1, FKEYS III, or ADOS to allow the use of 3 double-sided drives (or 2 D/S drives and **J&R's RAMDISKS**) as 6 S/S drives. Disk $16.95

AUTO DIM (CoCo III only) See Jan. '88 review. This hardware device protects your monitor, or TV from IMAGE BURN after a few minutes of inactivity from your keyboard. Illustrated and easy to install. Hardware $29.95

MPI-CoCo Locking Plate (CoCo III only) See Sept '88 review. Protects your CoCo III and Multi Pak Interface from destroying each other! Please specify MPI number 26-3024 or 26-3124 when ordering! SALE $7.95

NEW **Warrior King** (CoCo III only) Become Rastann, Warrior King, on the quest to regain his rightful crown hidden deep within a sinister land. Battle monsters, gain magic & weapons, and travel thru harsh wilderness & dark castle dungeons in this medieval realm. From the creator of Kung-Fu Dude comes this awesome arcade game for the CoCo III! Uses the most detailed 320 x 200 16 color graphics & high speed ML code to vault you into a world of fantasy! Dare ye challange the many perils ahead to become Warrior King? Requires 128k CoCo III, Disk drive, and Joystick $29.95

HALL OF THE KING TRILOGY (CoCo I/II/III) See December 1988 Rainbow review. The epic adventure is back! The largest adventure campaign ever seen for the CoCo is again available. A total of 6 DISK SIDES of intense graphics adventure will have you playing for weeks! Each section is a 2 disk stand alone adventure, but all 3 together form an epic saga! Quest for the legendary Earthstone in the ancient dwelling of the dwarves while you enjoy the classic graphics that made this trilogy famous! Each adventure can be purchased separately for only $29.95, the lowest price ever, or you can SAVE and purchase the entire set for only $74.95. Requires 64k, Disk drive, (and composite monitor for the CoCo III). Please specify HALL of the King I, II, or III .... $29.95 each or the entire 6 DISK Trilogy for only $74.95

In Quest of the Star Lord (CoCo III only) See Aug '88 review. This is THE graphics adventure for the CoCo III! Unparalleled 320 x 200 animated graphics will leave you gasping for more! You quest for the Phoenix Crossbow in this post-holocaust world of science and fantasy. Full **4 Disk sides** of mind-numbing adventure! Requires 128k CoCo III and Disk drive. **HINT SHEET** .... $3.95 (+ $1.00 S&H by itself) Disk $34.95

KUNG-FU DUDE (CoCo I/II/III) See Feb. '88 review. An exciting arcade game. The BEST karate game ever for the CoCo! Destroy opponents and evade obstacles as you grow ever closer to your ultimate objective! Spectacular graphics, sound effects, and animation! Requires 64k, Disk drive, and Joystick. Now displays color on CM8. Disk $24.95

PYRAMIX (CoCo III only) See Dec. '87 review. Brilliant colors, sharp graphics, and hot action in this 100% ML arcade game. You'll enjoy hopping Kubix around the pyramid, avoiding Kaderf, Smack, Smuck, & the Death Square! Disk .. $19.95

NEW **AD&D Character's Companion** (CoCo I/II/III) This great timesaving utility helps create compatible AD&D characters. Includes dice rolling routine, pick ability, race & class. Buy from the Players Handbook, magic items & spell materials. Save, load, and print character info. 3 Disk sides $24.95

White Fire of Eternity (CoCo I/II/III) See Dec '86 review. Enter the era of monsters & magic. Search for the legendary power of White Fire throughout the Forbidden Wood & Dark Caverns in this 64k animated adventure! Disk..$19.95

Champion (CoCo I/II/III) See May '87 review. Become a superhero in this action adventure! Disk..$19.95

Dragon Blade (CoCo I/II/III) See Nov '86 review. Slay evil dragon in this 64k animated adventure! Disk..$19.95

Cray also finds his word processor useful for cataloging books and records. And the word processor was a godsend for technical reports. Using *CoCo Max II*, he created figures and equations for engineering school assignments. Then he would set the margins and text blocks to leave room for the figures. After printing the text, he would run the paper through the printer a second time, using *HardCopy* to embed the figures in his text. This process resulted in some professional-looking reports.

Along this line, Cray would like to see software producers provide a simple way to use the IBM character set mode of many printers to create graphics. On an MS-DOS machine, special mathematics and graphics symbols are available using the ALT key and numbers from 160 to 254. Providing a means to do the same thing in a CoCo word processor would allow users who own printers with the IBM character set to create professional results easily.

Word Processing Comes Home

For home use, word processors are handy for helping you type up and send out letters. Back to the limited database motif, they can help you keep lists, your household inventories, etc. You can type up and print out messages for family members. You can keep track of addresses and telephone numbers. For club meetings you can print multiple copies of newsletters or agendas or minutes. Word processing sure beats copying or typing multiple copies manually!

Parents, imagine this: You could type in your weekly grocery list and print out several copies, one for each of your children. Say, Johnny goes after the fresh produce, Billy rounds up canned fruit and veggies, Mary gathers the eggs and the dairy products, and you can choose the meat and then examine the wares on the magazine rack. You could keep a grocery list template on disk to pull up every time you wanted to go to the store, and just fill in the blanks.

Word Processing Plans a Party

At home, Managing Editor Jutta Kapfhammer uses *Telewriter-64* to store her favorite recipes and to plan weekly menus, dinner parties and small get-togethers. Each recipe is stored in a separate disk file, with separate disks containing different food categories — Appetizers, Beef, Chicken, Desserts, Salads, Vegetables, etc. When she needs a particular recipe in the kitchen, she prints out a copy to refer to while cooking. When the dish is done, she simply discards the printout. No more sticky recipe cards!

She organizes her menu planning in separate files, too. A core file named `WEEKLY` is set up for weekly menu plans: Sunday through Saturday. She checks her weekly schedule to determine which nights she will be home for dinner, plans meals accordingly, and reads in food dishes from her recipe disks. She reviews the printed weekly menus to see if she is nutritionally on track, and also to avoid duplication when planning the following week's daily menus. The printed weekly menus are also beneficial for checking food inventory and making out weekly shopping lists.

For small get-togethers and dinner parties, Jutta has another set of menu disks, which are categorized by the type of menu she plans to serve — American, Chinese, Mexican, Menus on a Shoestring, Parties for Four, Parties for 30 or More, Get-Ready-Quick Parties, Snacks, etc.

For example, if she's having friends over for an evening of card playing, she might choose something from her Snacks' menu disk, which includes various menus of recipes for finger foods, like Mexican Food Lover's Delight — Mexican Pizza, Chile Con Queso, Hot Picante Sauce and Guacamole Dip served with side dishes of nacho chips, sliced Monterey Jack and pepper cheese, crackers and jalapeno peppers. She simply selects the type of party she wants to have, prints out the recipes and lists of items for the menu, and plans her shopping accordingly.

During the evening, if one of her guests asks for a particular recipe, making a printout is much less of a chore than copying the entire recipe by hand. After the party, she goes back to her Snacks' disk and edits her menu for Mexican Food Lover's Delight, indicating who attended the party (to avoid duplication of menu items the next time the same people are invited to dinner), preparation time, amount of leftovers, etc.

Word Processing Goes to School

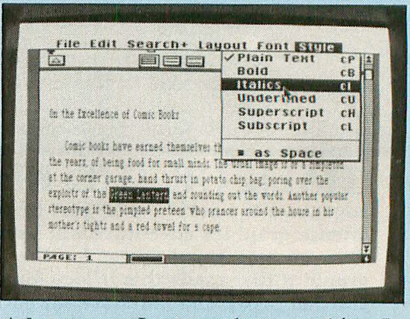
Have you ever typed up a 10-page term paper and realized about an hour before class that in your sleepy carelessness you left out two important paragraphs on Page 8? If you typed up the paper using a typewriter, you'd be in trouble indeed. But if you had used a word processor, a problem like this would be no sweat. You'd just reopen your document and add in those two missing paragraphs, print out a new copy, and then dash off to class to earn your good grade.

As everyone knows, teachers prefer typed copy over handwritten assignments. In fact, some demand it. And they prefer clean pages over heavily edited copy. Word processors give you that clean copy. If you notice a mistake on your work, instead of drawing in editing or proofreading marks, you can just make the change and print out a new copy.

Also, teachers prefer to read words that are correctly spelled. Some word processors come with spelling checkers, which check your document for errors. Spelling checkers will notice only misspellings of common words. Words that are not in its dictionary are assumed to be incorrect. Usually they will tell you that you misspelled your name, but they won't tell you that you used *then* when you should have used *than*. Of the word processors that do not have a spelling checker built in, most likely you can run a generic spelling checker on them, one

CoCo 3 Word Processors (continued)

Max-10



On the Excellence of Comic Books

Comic books have earned themselves th
the years, of being food for small minds. The usual image is of a youngster at the corner garage, hand thrust in potato chip bag, poring over the exploits of the Green Lantern and sounding out the words. Another popular stereotype is the pimpled preteen who prances around the house in his mother's tights and a red towel for a cape.

Advantages: In a word — graphics. In two words — graphics, fonts. It gives true WYSIWYG display. The point-and-click operation is effortless and speedy. A Hi-Res interface is provided. There is an integrated, internal spelling checker. Even downloaded Mac graphics can be imported.

Disadvantages: Its graphics make it slower than the programs that use the 80-column display. For the business end of business, it lacks — no mail merge. Though there is no copy-protection on the disks, the required hardware "clicker" on early versions can become annoying.

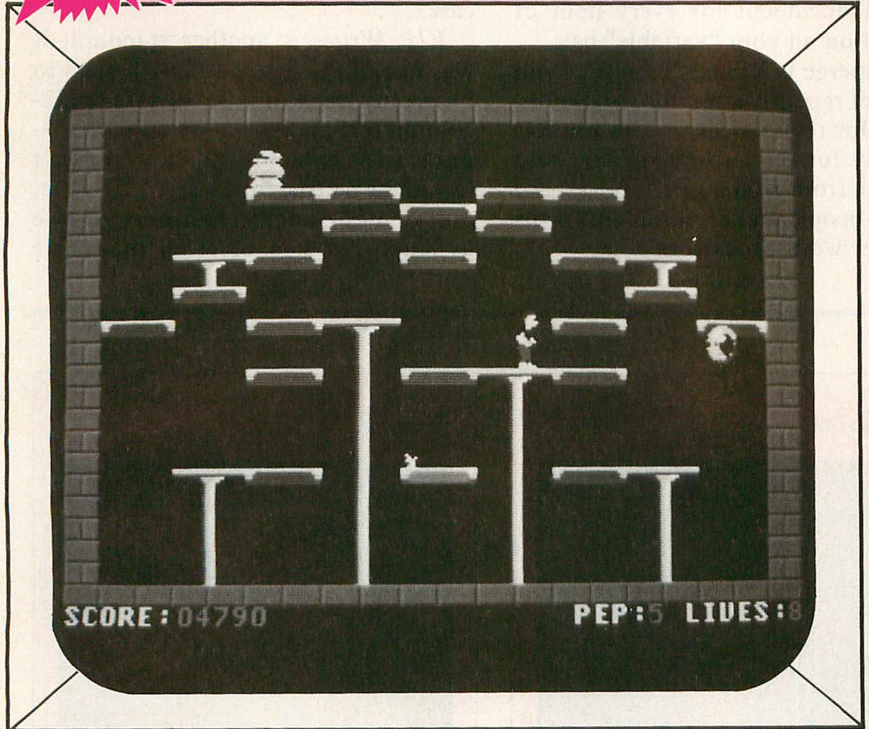
CoCoNutshell: If you already own *CoCo Max* graphics software, you must have this companion program. Desktop publishing can be accomplished.

For more information, see the review in January 1989's RAINBOW, *Page 118.*

GAME POINT
SOFTWARE

NEW

THIS MONTHS
Feature



Rupert Rythym

by Nickolas Marentes

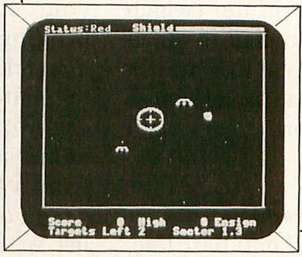
Help Rupert infiltrate "Music Box Records" and collect all of his stolen notes which are scattered throughout the complex. Ride the crazy elevators and beware of the security robots on patrol.

Rupert Rythym is a strategy arcade game featuring 17 different, 16 color graphic screens and some of the hottest digitized percussion music and vocals you've ever heard on your Tandy Color Computer 3.

Available on Disk or Tape. . .$24.95

WARP FIGHTER 3-D

by Steve Bjork



Blast in to Hyper-Drive with this fun-filled starship shoot-em-up! You'll have a captains' eye view out of your 3-D cockpit as you try to rid the galaxy of the evil enemy forces. Game includes 3-D glasses and works on any Color T.V., Composite or RGB monitor.

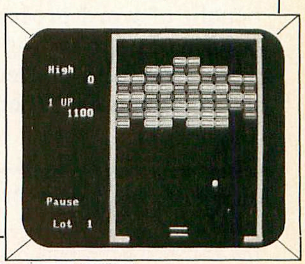
$24.95
(Extra Glasses $2.95)

baSh

by Steve Bjork

Based on a popular arcade game which we can't mention (But sounds like "Art Gannoyed"). BASH challenges you to clear the screen by "BASHING" your ball through multiple brick layers. Of course you'll have help getting through this 20 level game by activating options like, Slow Ball, Expanded Paddle, Multi-Ball, and more!

$24.95



NEW

SPACE INTRUDERS

by Nickolas Marentes

Enemy alien creatures have been identified entering our solar system, their destination: our home planet! Their goal: the total annihilation of our race. They must not be allowed to land!
An action arcade game featuring high quality 16 color graphics and sound effects.

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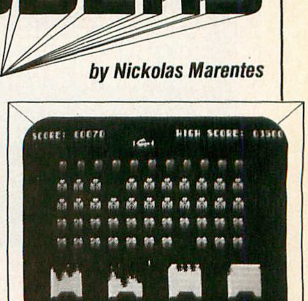
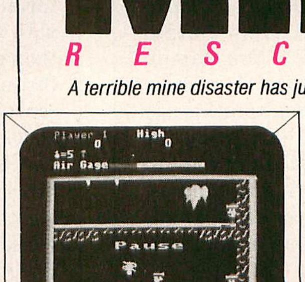


MINE RESCUE

by Steve Bjork

A terrible mine disaster has just occured and it will be up to you and your talents to enter the mine, jump the pits, avoid the spikes, fight off the bats and other creepy crawlers and get air to the needy victims. Mine rescue features over 2 megabytes of arcade-style graphics, real time music and multiple mine levels.

$24.95



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that accepts ASCII text (provided your program can output ASCII text — most can). One CoCo word processor, *Word-Power*, even has a rudimentary grammar checker.

Finally, most professors prefer text output on a daisy-wheel printer (which produces copy that looks like it rolled out of a typewriter) over a dot-matrix printer (which composes its letters as patterns of dots). But professors can't have *every*thing.

Getting Down to Business

Again along the limited database line, you could use your word processor to keep track of addresses and contacts, etc. If you write to the same companies over and over regarding the same types of things, you could just keep a copy of the letter you use on file (disk file) and later add in things like the date. The benefit of word processing is the automation of your writing process. You can store templates of frequently-used letters and memos. When you're ready to print out your correspondence and send it, you call up the letter shell and type in the name and address and any other pertinent information.

If your word processor has a feature called mail merge, you can automate your correspondence even more by printing out all your letters at once in a batch. Mail merge lets you join a template letter or document with a list of information — a mailing list of names and addresses you've purchased from a business associate, for example. Think of the letter as a constant and the list of information as variables; your printer will join them in a brief marriage that produces one customized and personal document for every item of information on your "variable" list.

Mail merge is a handy feature if you do a lot of repetitive, routine correspondence. Our reviews editor uses it a lot, especially for requesting software and hardware from companies.

Some people make and fill out forms with their word processors.

What's Available?

Quite a few word processors, actually. There are even different versions of the same program for the different models of the machine. *VIP*, *Telewriter* and *Elite*Word*, for example, have two versions each: one for CoCos 1 and 2, and one for the CoCo 3.

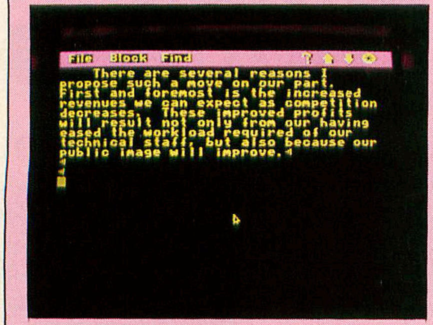
CoCo 1 and 2 Word Processors

One of the oldest of all the CoCo word processors, *Scripsit* is still around and kicking as *Color Scripsit II*, and it is still on a ROM pack, which means that to store files with it you need a cassette recorder. But you're limited to 32-column format and no true lowercase.

VIP Writer is another standard; it was one of the first word processors to break away from the limiting 32-column screen, expanding users' horizons with 64 columns. And it also shows lowercase as true lowercase. Of course, as it creates graphics characters to serve as letters, instead of using the native

OS-9 Word Processors

DeskMate & DeskMate 3



```
     There are several reasons I
propose such a move on our part.
First and foremost is the increased
revenues we can expect as competition
decreases.  These improved profits
will result not only from our having
eased the workload required of our
technical staff, but also because our
public image will improve.
```

Advantages: The word processors are packaged with several other useful applications, giving the programs a rounded feel overall. They are easy to learn and are a good gateway into OS-9 for beginners.

Disadvantages: They are heavily lacking in features. The software is hard-coded to allow a maximum output baud rate of only 1200. You cannot embed printer codes to give a more professional look to the output.

CoCoNutshell: The two are good for newcomers and those who only want to produce informal letters and memos. Others may want to steer clear unless they absolutely need an integrated package under OS-9.

For more information, see reviews in the April 1986 (Page 198) and December 1987 (Page 129) RAINBOWs.

DynaStar

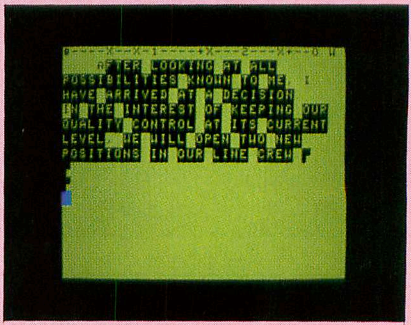
Advantages: The oldest of the OS-9 word processors, it includes versions for both Level I and Level II OS-9. It's filled with features and is relatively easy to use. It allows index and table of contents generation.

Disadvantages: The manual lacks tutorial material. The cursor is controlled with control key combinations rather than the arrow keys, making movement through the text somewhat awkward, especially for beginners. The spelling checker costs extra.

CoCoNutshell: It is an excellent word processor for business and home use, whether for clerical or programming work.

For more information, see the review in July 1984's RAINBOW, *Page 220.*

Xword



```
    AFTER LOOKING AT ALL
POSSIBILITIES KNOWN TO ME, I
HAVE ARRIVED AT A DECISION
IN THE INTEREST OF KEEPING OUR
QUALITY CONTROL AT ITS CURRENT
LEVEL. WE WILL OPEN TWO NEW
POSITIONS IN OUR LINE CREW
```

Advantages: It offers full support for use on Level I and Level II systems. And it supports any Word-Pak for 80-column editing on any CoCo. It's full-featured, including proportional justification for professional-looking reports and other work. The print formatter includes initialization files for several common printers. It has a high feature-to-dollar ratio, and it uses the arrow keys for movement through the text.

Disadvantages: The manual lacks tutorial material. The mail merge and spelling checker cost extra. It was sometimes difficult to get through Microtech's answering/ordering service to obtain support.

CoCoNutshell: Again, it is great for any application and is an excellent deal for anyone using OS-9.

For more information, see the review in July 1986's RAINBOW, *Page 170.*

letters themselves, the program is a bit slow. But at the time of its introduction *VIP Writer* was truly revolutionary. *VIP Writer* is part of an integrated package that includes a database, a spelling checker, telecommunications, spreadsheet and disk repair programs.

Another word processor that broke new ground for CoCo word processing is *Telewriter-64*, which can also show text at greater than 32 columns. *Telewriter* saves its files by default in a binary file format instead of ASCII, which conserves disk space. While you're entering text in the text mode, the screen seems similar to *VIP Writer*, but *Telewriter* is menu-driven. You can toggle back and forth between text and menu modes.

Both *VIP Writer* and *Telewriter* have been upgraded, or "patched," for various features. *Telepatch* is an important accessory for *Telewriter-64*, giving it such features as key repeat. *VIP Writer* has been patched to allow it to work on the CoCo 3.

*Elite*Word* is another of the early word processors. As far as user interfaces go in its class, *Elite*'s is probably the easiest to navigate. The commands available are always visible at the top of the screen; 32 columns are not enough to contain them all, but the ENTER key cycles through them while in the "command" mode. To initiate a command from the menu, you press the first letter of the command. *Elite*Word* is also part of an integrated family of programs that includes a spelling checker, a terminal program, a spreadsheet and a database manager.

CoCo 3 Word Processors

The birth of the CoCo 3 saw a veritable explosion of word processors written especially to take advantage of the machine's enhanced features. Power begat power, and now we users have a field of excellent CoCo 3 word processors to choose from.

One of the first of the older word processors to break from the pack into the CoCo 3 realm was *Telewriter-64*, which became *Telewriter-128*. The 64-column display expanded into 80 columns onscreen at a time, which is native to the machine. So *Telewriter* became much faster — it no longer had to translate typed characters into graphics characters and then perform all the calculations and screen redrawing necessary to reflect changes made as a user typed in or manipulated text. Going from the top to the bottom of a document became almost instantaneous. And moving up and down screen pages required no time-consuming redrawing of pages. By default *Telewriter-128* now saves files as ASCII files rather than binary.

Like *Telewriter*'s transformation into *Telewriter-128*, *VIP Writer* had gone turbo. It could also naturally display 80 columns on the CoCo screen. Which means, of course, that screen updates are a whole lot faster. Other improvements include a print spooler. Version 2 is yet another major revision for *VIP Writer III*, adding a configuration program, a popup help window and a backspace key.

Elite Word* also made the move from CoCo 1 and 2 to CoCo 3. Like *VIP* and *Telewriter*, it also moved to the CoCo 3's native 40 and 80 columns. The screen format is retained, but now more of the available options can fit at the top of the screen at one time; in 80 columns, they all can.

WordPower 3.2 is another powerful contender in the CoCo 3 word processing arena. Just think of any word processing feature — chances are very likely that *WordPower* has it. *WordPower* packs a lot of features. Though its origins are with the CoCo 3, it has already gone through a couple of upgrades, and Version 3.3 is in the works. *WordPower* already includes the now-standard 80-column screen, and it even has spelling and grammar checkers.

WordPower is in a perpetual process of evolution. The people at Microcom welcome your comments. In fact, if you call them up and tell them you wish *WordPower* had such-and-such feature, chances are that you will see that feature in the program's next incarnation. They have even been known to customize the program for their registered users.

A newcomer, *Simply Better* is a word processor that might make the market sit up and take notice. It looks a lot like *VIP Writer III* Version 1, but it adds such things as sorting abilities and index generation. This is another program brimming with features, yet it's sold at rock-bottom prices.

Simply Better's "Window" command, which splits the screen in two, in effect opens up another independent word processor on the screen. You can work on two documents at the same time, switching back and forth between them with the CLEAR key. The feature supports the cutting and pasting of text between documents.

If you're a serious-minded power user with an eye toward complex document formatting, *TextPro* from Cer-Comp may be the way to go. With its command-driven line editor operation, it seems more like a programming environment than a word processor. In fact, it's marketed equally as a text editor, which means you can use it for programming. But it's not easy to learn. Cer-Comp tells you that up front — it was not designed for the casual computerist. *TextPro*'s typical user would be a hacker or someone who wants to write and format a long document, such as a manual.

With its formatting commands, *TextPro* can display up to 212 characters onscreen, although it is advised that for clarity 160 characters is the visual upper limit (on a Hi-Res monochrome monitor). It can also show onscreen bold, italics and underlining. There are configurations for several printers, including the Okidata Laserline 6, a laser printer that Cer-Comp used to print its typeset-quality manual.

Max-10 is a new breed of word processor. It is a word processor, yet it's more, and maybe, less. It goes back to the old method of displaying its characters — as graphics characters, which makes it slower. But its benefit is that it allows you to choose from a wide variety of fonts, almost like a desktop publisher. You can even incorporate graphics as picture files. You could either consider it a word processor with desktop publishing features, or a desktop publisher with word processing features.

The interface is exciting — mouse- or joystick-driven with pull-down menus and dialog boxes. It offers a true WY-

STOP
FOOLING AROUND
If you do any word processing, get
Max-10™
If you do any graphics, get
CoCo Max™
Be amazed or your money back.
See big ad around page 19. COLORWARE

SIWYG (What You See Is What You Get) display! Another plus is the spelling checker, which is integrated, allowing you to access the dictionary from within the program.

OS-9 Word Processors

In terms of editing features, there is really little difference between Disk BASIC and OS-9 word processors. The exception is that the full-featured OS-9 word processors are more modular: One program is used to enter and edit the text file and another is used to format and print it out. All codes for margins, headers, print styles, etc., to be read by the formatter are entered within the text by the editor.

This arrangement stems from the days of Level 1, when having both programs in memory severely reduced the text buffer size as well as limited the system's resources for other processes. This has carried over into Level II. The main disadvantage to this setup is that you don't get any form of WYSIWYG display of your text before printing. Still, if you spend a great deal of time in OS-9, you wouldn't want to be switching back and forth to Disk BASIC just to write some text.

The two OS-9 word processing systems currently being marketed through THE RAINBOW are *DynaStar* from Frank Hogg Laboratories and *Xword* from Microtech Consultants. In addition, limited text editing/printing facilities are provided by Tandy's *DeskMate* and *DeskMate 3*. Let's look at the latter two products first.

DeskMate and *DeskMate 3* offer excellent value for newcomers to the Color Computer. For one price you get some hands-on experience with several different computer applications (word processor, spreadsheet, database and graphics). Each application is limited — by no means do you get feature-packed programs. But you do get a feel for each particular application and are better armed when the time comes to seek more power. Also, some people find the *DeskMate* programs provide all the features they want.

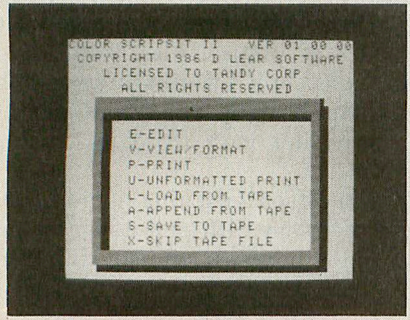
While the software operates in the OS-9 environment, little knowledge of OS-9 is required to use the programs. In fact, this minor exposure to OS-9 can help should the user decide to make the jump into the operating system. As with all things computer, it is merely a matter of choice.

DeskMate's text editor allows the user to save, load, copy and delete blocks of text. You can merge files at any point in the text. It also features some limited search and replace capability. The main disappointment is that it provides no means by which to embed printer control codes; you can't change type styles while printing. The software works fine for printing casual letters, memos and general text work. If you are at all serious about how your text looks, however, it won't be long before you are looking elsewhere.

Both *DynaStar* and *Xword* are full-featured word processors that have been around for a while and stood the test of time. Both allow block manipulations, insert/overstrike, wordwrap,

CoCo 1 & 2 Word Processors

Color Scripsit II

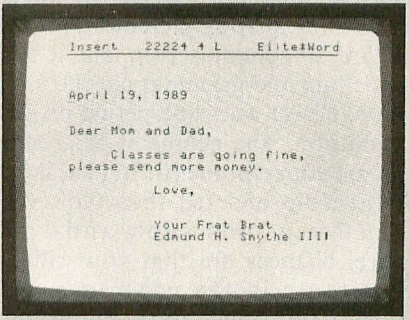


```
COLOR SCRIPSIT II   VER 01 00 00
 COPYRIGHT 1986 D LEAR SOFTWARE
    LICENSED TO TANDY CORP
     ALL RIGHTS RESERVED

      E-EDIT
      V-VIEW/FORMAT
      P-PRINT
      U-UNFORMATTED PRINT
      L-LOAD FROM TAPE
      A-APPEND FROM TAPE
      S-SAVE TO TAPE
      X-SKIP TAPE FILE
```

Advantages: It's an entry-level, menu-driven word processor with some surprisingly complex features. It works for CoCo 1s to CoCo 3s and does not require much in the way of equipment.
Disadvantages: There is only tape I/O, no disk drives allowed. Even though it can run on a CoCo 3, it can display only 38 columns onscreen at a time. Some of the commands issued from within the text mode are difficult to remember, nonintuitive. There is no true lowercase.
CoCoNutshell: This is a good first word processor and does not require extensive cash outlay. It's primitivism may bother you if you've ever used another word processor.
For more information, look for the review in an upcoming issue of THE RAINBOW.

*Elite*Word*



```
Insert   22224 4 L    Elite*Word


April 19, 1989

Dear Mom and Dad,

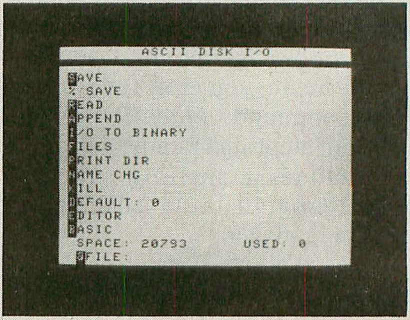
     Classes are going fine,
please send more money.

            Love,

            Your Frat Brat
            Edmund H. Smythe III!
```

Advantages: It is a well-rounded, easy-to-learn word processor for the CoCo 1, 2 and 3 that can run in as little as 32K. At the top of the screen in the command-line area are "buffer" indicators that keep you constantly informed on how many characters you have typed.
Disadvantages: The spelling checker comes extra. The menu-driven interface may irritate users more comfortable with command-driven interfaces.
CoCoNutshell: It makes a very easy-to-use mainstream word processor that should be adequate for general and school use. The menu, which is always visible onscreen, makes the program especially appropriate for beginners.
For more information, see the review in March 1984's RAINBOW, *Page 260.*

Telewriter-64



```
          ASCII DISK I/O
AVE
% SAVE
EAD
PPEND
/O TO BINARY
ILES
RINT DIR
AME CHG
ILL
EFAULT: 0
DITOR
ASIC
 SPACE: 20793       USED: 0
 FILE:
```

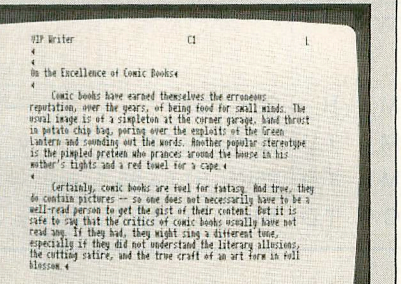
Advantages: Totally menu-driven, it is extremely easy to use. A counter keeps track of the number of words typed, as well as the number of lines. Embedding commands in your text for printer control is easily accomplished.
Disadvantages: There is no spelling checker. While it does provide true upper-/lowercase screen display, there are no true lowercase descenders; however, this is a function of the screen display only.
CoCoNutshell: As written, the program runs perfectly fine on the CoCo 3, so if you buy a CoCo 3 later, upgrading is not absolutely necessary unless you prefer the 80-column display and the added features of *Telewriter-128*.
For more information, see reviews in RAINBOW *issues June 1983 (Page 216) and August 1987 (Page 143).*

etc. Each uses a stand-alone formatter for printing. And both work under OS-9 Level I or II.

DynaStar works much like the older versions of *WordStar* for the MS-DOS machines. The main files are intended for Level II, but the Level I versions are included on the disk. The differences here are the screen layout, pop-up menus in Level II windows, and standard advantages of Level II over Level I. It's a command-driven system in which menus can turn on and off.

When you start, the menus will be turned on. To access the various features, you first enter a control sequence. An example would be CTRL-B to access the Block menu. Then you press a single key corresponding to the function you want performed. On the Block menu, you might press C to copy a marked block to another location in your text. After you have used the system for a while and have learned how to use its features, you can turn the menus off. Otherwise, a menu will always appear at the top of the screen.

VIP Writer



```
VIP Writer                    C1                  1
◂
◂
On the Excellence of Comic Books◂
◂
     Comic books have earned themselves the erroneous
reputation, over the years, of being food for small minds. The
usual image is of a simpleton at the corner garage, hand thrust
in potato chip bag, poring over the exploits of the Green
Lantern and sounding out the words. Another popular stereotype
is the pimpled preteen who prances around the house in his
mother's tights and a red towel for a cape.◂
◂
     Certainly, comic books are fuel for fantasy. And true, they
do contain pictures -- so one does not necessarily have to be a
well-read person to get the gist of their content. But it is
safe to say that the critics of comic books usually have not
read any. If they had, they might sing a different tune,
especially if they did not understand the literary allusions,
the cutting satire, and the true craft of an art form in full
blossom.◂
```

Advantages: Its command-driven user interface allows speedy operation. The buffer size is fairly large, permitting larger documents. A spelling checker is included. More than the normal 32 columns can be displayed onscreen at once. There are a wide variety of cursor movement commands.

Disadvantages: It has to be patched for operation on the CoCo 3. Subsequent patching and upgrading fees can be substantial. Screen updating can make operation slow. Commands are not intuitive and can be difficult to remember.

CoCoNutshell: It makes a good editor's word processor and is practical for those who spend a lot of time writing.

For more information, see the review in October 1983's RAINBOW, *Page 280.* VIP Writer *was formerly known as* Super Color WriterII.

To issue formatting, style and other commands for printing, you use dot commands within the text file. These are simply two- or three-character commands, preceded by a period and appearing on their own line in the text file. When you print the file through *DynaForm*, the print formatter included with *DynaStar*, these commands are interpreted and your text will be printed as you like. At first you might not like working with dot commands. There are a lot of them and it may seem hard to remember. In actuality, after minimal use you'll find they make sense and memorization is natural. The *DynaStar/DynaForm* system offers margin control, headers and footers, printing macros, variables, generation of index/table of contents and more. It even provides excellent mail-merge capability.

Not included with *DynaStar*, but available at extra cost, is *DynaSpell*, a spelling checker written by Dale Puckett. This system includes both 102,000-word and 20,000-word dictionaries. It works with both Level I and Level II.

Xword is another system originally designed for OS-9 Level I. *Xword* really consists of Microtech Consultants' *Xed* full-screen editor, a display module called `xcodes` and `xp`, a print formatter. When you boot *Xed*, it looks for the xcodes modules to tell it what type of screen you are using. The system includes modules for the standard 32-column screen, an OPak Hi-Res screen, an *Xscreen* Hi-Res screen, all Word-Pak 80-column screens and Level II windows. The manual included is written for Level I and indicates that the CLEAR key is used as a control key. Of course, under Level II the CLEAR key is used to change windows: You must keep in mind that you should use the CTRL key in place of the CLEAR key when using the manual.

Xword is command-driven. It utilizes a command mode and a block mode, both of which work similarly to *DynaStar*. First, enter CTRL-C (or CTRL-B for blocks). Then press a single key corresponding to the command you want performed. No menu appears. If you need help, however, you can just press a question mark at the prompt. *Xword* allows quick and easy movement through text and supports indexing, auto-indentation, programmable keys and macros, and more.

The print formatter included with *Xword* is not much different from that described for *DynaStar*. One very useful feature, though, is its support for proportional justification. If your printer features a proportional mode and includes a table of dot widths for each character, you can provide these dot widths to the formatter for proportional justification. This means that very small spaces are inserted between characters rather than extra whole spaces being added between words for justification. This is also known as microjustification, and it results in great-looking hard copy.

As with *DynaStar*, *Xword* does not include a spelling checker. Also, it does not include mail-merge capability. However, both a 40,000-word spelling checker (*Xspell*) and a mail-merge utility (*Xmerge*) are available from Microtech Consultants.

The one truly disappointing aspect of the OS-9 packages we looked at is that the manuals do not include much in the way of tutorial instruction or examples. All the features are explained quite well, but the user is not given much idea where and when he might want to use each feature in his work. If you have been around computers and word processors for a while, your "getting started" time will be drastically reduced. Otherwise, the packages work well and provide OS-9 users with excellent word processing capability. A really important aspect of these systems is that as full-screen editors they are also great for writing and editing source code for your own programming. If you regularly use OS-9, you should have one of these programs. Or, perhaps, you could consider one of them as a reason for getting into OS-9.

Our Feature Presentation

Flipping through the pages of THE RAINBOW, you might think there's a features war going on between the various vendors of word processors. Is there some overkill here? How much is too much? For some people, there can never be too much. But for people who have gotten used to less, lots of features will seem like needless extravagances. Often, one company will come out with a feature that is so popular that all other vendors copy it, users clamor for it, and it quickly becomes standard. The 64-column screens on the CoCo 1 and 2 are an example. Now it's looking like mail merges and split-screen editing are some of the hot items. If you feel like you need a map just to keep up with the features war, see our chart on Page 38.

Plain-vanilla word processing (churning out letters and the occasional report) requires little in the way of features. Most people use only a few commands in their everyday use of a word processor. But it's nice to know that those little extras are there for special occasions.

Buffer size is a highly touted feature — the bigger the buffer the longer the document can be. For CoCo 1 and 2 word processors this can range from about 13K to 49K. On the 128K CoCo 3, this figure can range from 48K to 72K; on the 512K CoCo 3, up to 460K. Be wary, though, of a buffer size that seems too high — if a word processor for the 128K CoCo 3 has a buffer of 124K, for example, you might ask yourself if you want to risk buying a word processor that runs in only 4K. (Gross exaggeration!) *Elite*Word* and *Elite*Word/80* have a handy feature that shows you how much buffer space you have left as you type, character for character.

If you get eyestrain squinting at 64- or 80-column text, you might want to check and see if your prospective word processor supports text in 32 or 64 columns. Of the CoCo 3 word processors, all but *WordPower* 3.2 support the 40-column screen. Conversely, if you are a CoCo 1 or 2 owner and you like teeny-tiny text characters, check to make sure that the word processor you buy can do the 64-column mode or better. Of the four CoCo 1 and 2 programs we are discussing, only *Color Scripsit II* cannot display more than 32.

If you hate wasting printer paper, onscreen preview is a must feature for you. Fortunately, most word processors have this feature, which shows you page breaks and margins, etc., as they will appear when printed. On less-than-80-column displays, the previewed text often extends past the right margin, but is scrollable.

Spelling checkers are a must if you produce documents for public consumption. Imagine how embarrassing it would be to have coworkers snicker at you over misspellings in your memos. *Max-10*, the *Elite* and the *VIP* programs have "customized" spelling checkers (optional/extra cost for *Elite*, but included with purchase for *VIP* and *Max-10*). *WordPower* and *TextPro* both include a public domain/shareware spelling checker, *Spell 'n' Fix* (it's posted on Delphi), with the purchase of their word processors. Generic spelling checkers like *Spell 'n' Fix* will work with most word processors that generate ASCII files.

To perform a spelling check on your document, you save your text, exit the word processor, then boot the spelling checker. Of all the spelling checkers we've covered, only one works inside the program — *Max-10*'s. You do not have to exit the program to access the dictionary and perform spelling checks.

Most spelling checkers allow their users to create customized dictionaries — files that will contain names and other words you type frequently that are not in the spelling checker's dictionary.

Of all the CoCo word processors discussed, only one gives you a "windowing" ability, letting you work on more than one file at a time — *Simply Better*. (*WordPower* 3.2 has a similar feature called splitscreen editing; it lets you "freeze" one portion of your document and "glue" it to an area of the screen, where you can view it for reference while working on another part.) Other interesting features that seem to be *SimplyBetter*'s exclusive properties include sorting capabilities and table of contents and index generation. This is pretty heavy stuff.

Say you're writing an essay on pop stars of the last 20 years and you realize you misspelled "Engelbert Humperdinck" 15 times as "Ingelburt Humperdink" — at least you were consistent. An easy way to fix the problem would be to *search* for the incorrect spelling and *replace* it with the correct one. The search-and-replace feature can save you a lot of time, and it can skip you quickly through your document to exactly where you want to be. Fortunately, all the word processors we've talked about can do search and replace. *Telewriter* can even handle wildcard searches (perform a search in which one or more letters are missing: searching for "p*t" might yield "pat," "part," "planet," "pet," "print," etc.).

Macros let you assign functions to

Features Comparison	Requirements	Price $	I/O (T)ape, (D)isk	(C)ommand-, (M)enu-driven	Supplied on (T)ape, (D)isk, (R)OM pack	Maximum file length	Columns displayed onscreen	Onscreen preview	Spelling checker	Windows for editing	Save block as file
CoCo 1 & 2											
Scripsit	16K	29.95	T	M	R	20K	32,[g]	y	—	1	y
Elite*Word	32K	69.95	T,D[a]	M	T,D	22K[d]	32,64	y	y	1	—
Telewriter-64	16K	59.95	T,D[a]	M	T,D	25K[e]	51,64,85	—	—	1	y
VIP Writer	32K	69.95	T,D	C	T,D	49K	51,64,85[h]	y	y	1	y
CoCo 3											
Elite*Word/80	128K	79.95	D	M	D	48K	40,80	y	y[i]	1	y
Max-10	128K	79.95	D	M	D	64K	NA	NA	y	1	y
Simply Better	128K	29.95	D	C	D	80K	40,80	y	—	2	y
Telewriter-128	128K	79.95	T,D	M	T,D	48K	40,80	y	—	1	y
TextPro	128K	89.95	D	C	D	50K	80...212	y	—	1	—
VIP Writer III V.2	128K	79.95	T,D	C	T,D	48K	40,64,80[h]	y	y	1	y
Word Power 3.2	128K	79.95	D	M	D	72K	80	y	y	1	—
OS-9											
DeskMate	64K	59.95[b]	D	M	D	23K	32,40,80	—	—	1	y
DynaStar	LI,II	99.95[c]	D	C	D	—[f]	80	—	y[i]	1	y
XWord	LI,II	69.95	D	C	D	—[f]	80	—	y[i]	1	y

[a] tape I/O is for tape only, disk I/O for disk only
[b] $69.95 for *DeskMate 3*
[c] special price
[d] 13.5K on a 32K machine
[e] 36K with cassette
[f] limited by disk size only
[g] 38 columns are possible on the CoCo 3
[h] 32-column displays are also supported
[i] optional and at extra cost
[j] older versions are protected by a hardware key
[k] with *TelePatch*

programmable keys. For example, the setting of a print format code could be reduced to one keystroke. Or, frequently typed text can be assigned to a macro: If you're a partner in the firm of Finkelstein, Kriek, Bach, Anderson, Burns and Newby, you could type that mouthful of a company name in your business correspondence with just one keystroke combination. This is a power user feature and very useful.

Even though our Color Computers had color all along, it was with the arrival of the CoCo 3 that the software really began to get into the hue of things. Now practically every CoCo 3 word processor on the market (with the exception of *Max-10* and *TextPro*) comes with support for designer colors that you select, and you can make your selections stick in a configuration program. Besides color, things such as baud rates and printer codes can be configured. After you make your choices and answer all the prompts, the word processor will boot with all the specifications made. The changes don't have to be permanent — the configuration program can always be run again.

Print spooling is another of the power user's features. It frees the computer from being tied to the printer while long documents print out.

Auto-saving is a feature that is sure to elicit a vehement opinion from most any computer user. Those opposed recount tales of brilliant inspiration lost to the void: The computer's tendency to halt everything and save text while the computerist is in the middle of a typing frenzy can be very disturbing. On the other hand, those in favor of it tell of miracles in which their computer saved the research paper, the report and the short story from the dark clutches of the power surge. If you are ordinarily a cautious or paranoid person — or one who forgets to make frequent saves — this feature is for you.

For business use, mail merge is a must-have feature. Many of the word processors we've discussed support it. Neither *VIP Writer* nor *VIP Writer III* have mail merge by themselves: In conjunction with *VIP Database* and *VIP Database III*, *VIP Writer* can perform mail merge functions.

Other basic, common, various and sundry features that pretty much all word processors have are wordwrap, key repeat and insert/overstrike modes. Thanks to word wrap, word processor users do not have to press RETURN or ENTER until they reach the end of a paragraph; unlike with a typewriter, you do not have to press RETURN at the end of every line. Key repeat is a blessing when you want to create long strings of characters for whatever reason — or if you want to hold down the space bar and get somewhere in a hurry. In the insert mode, text entered at an insertion point pushes text that follows the cursor to the right. In the overwrite mode, you can type over and "wipe out" text.

Some features that are less common but very useful are word counts, printing in multiple columns and the display of page breaks. Word counts help writers stay within limits. Printing in multiple columns comes in handy if you are in charge of printing informal newsletters. And page breaks provide you with a little bit of formatting information.

And for our final feature, let's talk about support for 512K on CoCo 3s: Most of our CoCo 3 word processors support it (all but one). Obviously, if you haven't made the 512K upgrade and are still putting along at 128K, this is not an issue for you. Of course, if you have, power user, then you will want to take advantage of all the memory you can.

User Interfaces

What kind of car do you like to drive, manual transmission or automatic? The answer to that question will probably determine which kind of interface you are more suited for, command-driven or menu-driven. As you can probably guess, command-driven interfaces equate to manual transmission, automatic to menu-driven.

Command-driven interfaces let you issue your commands directly, putting you closer, perhaps, to the guts of the program. They also seem faster and more powerful (you can initiate a com-

Search & replace	Table of contents generation	Index generation	Sorting	Math	Macros	Online help	Copy-protected	Tutorial	Configuration	Key repeat	Print spooler	Auto saving	512K support	Mail merge	Block functions	Columns	Page break
y	—	—	—	—	—	—	—	y	—	y	—	—	—	—	y	—	—
y	—	—	—	—	—	—	—	y	y	y	—	—	—	y	y	—	y
y	—	—	—	—	—	—	—	y	n[k]	n[k]	—	—	—	—	y	—	y
y	—	—	—	—	y	y	—	y	y	y	y	y	—	n[n]	y	—	y
y	—	—	—	—	—	—	—	y	y	y	—	—	y	y	y	—	y
y	—	—	—	—	—	—	n[j]	y	y	y	—	—	y	—	y	y	y
y	y	y	y	—	y	y	—	y	y	y	y	y	y	y	y	—	y
y	—	—	—	—	y	y	—	y	y	y	—	n[m]	—	—	y	—	y
y	—	—	—	—	y	—	y	y	y	y	—	—	y	y	y	y[p]	y
y	—	—	—	—	y	y	—	y	y	y	y	—	y	n[n]	y	—	y
y	—	—	—	y	—	y	—	y	y	y	y	y	y	y	y	y	y
y	—	—	—	—	—	y	—	y	—	y	y	—	y	—	y	—	y
y	y	y	—	—	y	y	—	—	—	y	y[l]	—	y	y	y	—	—
y	—	y	—	—	y	y	—	—	—	y	y[l]	—	y	y[o]	y	—	y

[l] print spooling is a function of OS-9
[m] manual "quick saves" are possible
[n] mail merge is possible with *VIP Database*
[o] comes at extra cost
[p] coiumns are a function of the printer

mand with one keystroke or a two-keystroke combination rather than wade through a menu), and they let you feel you're controlling the show.

Menu-driven programs let you give commands by presenting you with a choice of options and asking for a selection. This is great for beginners who know little or nothing about the program they're trying to operate, but menus get in the way of users who already know what they're going to do. (That's why menu-driven programs like *WordPerfect* have dozens and dozens of books and programs published to provide macros for power-hungry users.) The disadvantage to command-driven programs is that they are more difficult to learn, as they do not prompt you along. (But that is what help screens and manuals are for, right, power user?)

Some CoCo word processors seem to be a curious hybrid of the two interfaces, though. There is an initial, short menu, but within the text mode you can issue direct commands. *Color Scripsit II* and *WordPower* fall into this category.

Summing up, frequent, heavy-duty users should go with the command-driven interface, and beginning or occasional users should stick with the menu driven.

What Is ASCII?

Acronymically, ASCII is the American Standard Code for Information Interchange. As it says, it's a standard. What this means is, you could prepare a document in *WordPower* and call it up inside *Telewriter*. You can share documents with a friend who has a different word processor. If the file is saved in ASCII, it's portable. In fact, if you have the correct null-modem connection or access to an online database, you can share a text file with all manners of computers — even Commodores and MS-DOS machines.

If you ever decide to change word processors, you better hope that the one you're changing from can output ASCII files, else you'll have to type important files in all over again. With ASCII, you won't have to trash your files or rekey data. The early version of *Telewriter* saved its files in a binary format by default though it could save files in ASCII, which can be hairy. Imagine you're a poor editor who has just received a 25-page document to edit, and the disk file is prepared in non-ASCII format, and you don't have access to a word processor capable of reading it — it happens, folks.

The Printed Word

The most commonly used printers in the CoCo Community are the Radio Shack DMP series and Epson/Epson-compatibles. Of course, each printer, even within a single company's product line, will have its own special way of handling things. Control codes and features will vary from model to model. The word processors we looked at are very flexible in terms of which printers they will use, and most companies will do their best to help you with "non-standard" printers.

Daisy-wheel printers produce excellent hard copy. At the same time, it is often difficult to use various type styles because it is necessary to change the print wheel to do this. Many users who want the quality of type produced by daisy-wheel systems are choosing to go with one of the many new typewriters on the market. These units often include (or have available) a parallel interface that can be connected to the CoCo via a serial/parallel converter. This way, these users have the added advantage of owning a typewriter for small jobs.

Most dot-matrix printers offer a near-letter-quality (NLQ) mode that looks quite good. A consideration here is the number of pins in the head. Low-end printers use nine pins and produce characters that look choppier than those produced by printers with 18 or 24 pins. In addition, for those who want to be able to print graphics in addition to text, dot matrix is a must. Since most CoCo users will want to buy only one printer, the dot-matrix system is probably the way to go. You will need to check with the dealer to determine the features (type styles, character sizing, etc.) available. Of course, there are always exceptions. If your main or only concern is writing text, you will want to go with a daisy-wheel system.

At a minimum, you want a printer that is capable of backspacing, bold type (often called double-strike) and underlining. For the purpose of clerical work, it is often advantageous to have a printer that supports friction feed (used for single-sheet printing) as well as tractor-feed mechanisms. Another consideration is the pushfeed (where tractor-feed paper is pushed rather than pulled across the platen). This reduces paper waste. Finally, some newer printers now support paper parking to ease the transition between using fanfold paper and single sheets.

With the exception of *DeskMate* and *DeskMate* 3, the software we looked at allows baud rate settings as high as 9600 baud. Therefore, using a printer's parallel port with a serial/parallel converter allows quicker printing. Without a serial/parallel converter, using anything other than a Radio Shack DMP model is very difficult. Even if the non-Tandy printer sports a serial interface, designing a cable to connect the printer to the CoCo is often very tedious work.

What's Best for You?

Again, that's best decided by analyzing yourself, what kind of person you are and the uses you will be putting your word processor to. (For help in making an intelligent choice, see Willis Stanley's *AHP* program featured in "Decisions, Decisions," Page 118 of this issue.) If you're a stick-shift person, then you might consider *VIP Writer*, *Simply Better* or *TextPro IV.* If you like the ease of menus, then maybe you should try *WordPower*, *Max-10*, *Telewriter*, *Elite-*Word* or *Color Scripsit II.* If you are going to be using your word processor for business, then you'll definitely want mail merge and a spelling checker. If you are going to be using it for school, you are really going to want a spelling checker.

Those with an artistic bent should lean toward *Max-10*, and those who are serious hackers should seriously consider *TextPro IV.* Hobbyist writers and wordsmiths might want to check out *WordPower.* People who will be using their word processors for business should consider *SimplyBetter*, *VIP Writer* and also *WordPower.* People interested in easy and friendly word processors should look at *Elite*Word* or *Telewriter*, and those who feel more at home with Tandy products should check out *ColorScripsit II.*

Also, think about how long your documents are going to be — two pages or 200? Some word processors have a limited buffer area that allows you to type in and manage only so much text at a time.

If you're a person whose friends despair over what to get you for your birthday because you already have everything, then it's probably safe to assume that you're a features person and would do best with a feature-packed word processor. If mainstream word processing is more in your line, and you find an abundance of features extravagant and useless, then a plain-vanilla program may be the ticket for you.

So you see, it depends on the kind of user you are, occasional or intensive. What'll it be, Cadillac or Ferrari?

Under the new law, when you write a program, it is automatically protected by copyright

Copyright Law Update:

Congress Alters Rules of Copyright Notice

By Edward Samuels

A significant change was made in the federal copyright law on March 1, 1988. Since that date a person can get a copyright in a computer program — or in any other work of authorship — without any formalities whatsoever. The requirement of copyright notice (for example, "© Copyright 1988 by Edward Samuels") has been abolished. When you write a program, it is automatically protected by copyright; when you publish it, it remains copyrighted even if you don't use the copyright notice. And you need not register your claim anywhere for it to be effective. For reasons I will explain here, you may still want to add copyright notice to your programs — and even register important programs with the Copyright Office — in order to get maximum benefit under the statute. But you don't have to do anything except create a program in order to have a copyright in it.

Copyright Protection Since 1978

In order to understand the new copyright law and why it was enacted, it is first necessary to take a look at the old law as it has been in effect since 1978. This law is explained in my article, "Computer Program Copyrights: A How-to Guide," published in the April 1987 issue of THE RAINBOW. In summary, since 1978 it has not been necessary to do anything to obtain a copyright in a computer program except to fix it in some material form such as a printed listing, tape or disk. When and if you published the computer program by making copies available to others, it was necessary to place the copyright notice somewhere in the listing of the program, on the tape or disk, or on the screen display. This notice consisted of writing the symbol © or the word *copyright*, the date of publication and the name of the copyright owner. Although there were some provisions for adding the notice even after a publication that omitted it, the notice requirement was most easily satisfied by simply including the notice in all published copies of the work. It was not necessary to register the work with the copyright office, although such registration was recommended to preserve the maximum benefit under the statute.

The Berne International Copyright Treaty

The trouble with copyright notice was that hardly any other country in the world required it. Indeed, the United States requirement of copyright notice on all copies of published works caused friction between the United States and many other countries. Since 1886, the most effective international copyright treaty recognizing copyright in authors from other countries was the Berne Treaty. That treaty stated that no participating country could require any "formalities" in order to obtain copyright protection within that country. The United States copyright law clearly failed to meet the test of Berne in this and several other respects.

In 1954 the United States persuaded many other countries to agree to a second international treaty, the Universal Copyright Convention, with less stringent standards that the United States copyright law could meet. This provided some protection in foreign countries for U.S. authors and in the United States for foreign authors. But it has remained an international embarrassment that the United States' copyright laws did not measure up to the *higher* standards of Berne. Particularly in recent years, as the United States has argued strenuously that other countries should improve their copyright laws (for example, by expanding them to cover computer programs), other countries have asked why we are not up to the generally accepted standards of Berne.

Finally, after several reforms in the 1978 copyright law and in the new 1988 amendments, the remaining obstacles to our adopting the Berne Treaty have been removed, and indeed the Senate formally ratified the Berne Treaty. The

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Edward Samuels, a professor of law at New York Law School, has taught copyright and other legal subjects for more than 10 years. An avid reader of RAINBOW, Professor Samuels enjoys sharing his CoCo with his children, 8-year-old Richard and 4-year-old Claire.

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most important change, for our purposes, is the elimination of all formalities in obtaining copyrights, including the notice requirement.

Effective Date

Although the Berne Treaty was ratified by the Senate, and the copyright amendments implementing it were passed in October 1988, the new amendments didn't go into effect until the United States formally deposited a copy of the ratification with the World Intellectual Property Organization on November 16, 1988. Under that document, the effective date of the treaty and of the new amendments to the copyright law was March 1, 1988.

Getting The Best Copyright Protection

You don't have to do anything to get copyright protection of a computer program except write it down or store it in a physical form from which it can be copied. However, copyright notice and registration are recommended in order to get the best protection.

Notice

The new statute says that copyright notice may be placed on all published copies of a work. If such a notice is used, then "no weight shall be given" to a claim by someone who copies your program based on "innocent infringement" to reduce the amount of money the user might have to pay in damages. Although the statute doesn't precisely say so, this implies that if you don't use the notice and if people making a copy of your program are not able to contact you to get your permission because they can't find out who owns the copyright, then they may appeal to the court to reduce the amount of money they have to pay in damages. "Innocent infringement" is thus a partial defense — but not a complete defense — to a copyright suit, but only if there is no copyright notice. Accordingly, I encourage you to continue to use the copyright notice on all copies of your computer programs or other works, since it costs absolutely nothing to write the magic words — the symbol © or the word *copyright*, the year of publication and the name of the author.

Registration

I still recommend that you register your work with the copyright office if you have a realistic expectation of receiving money for it. Just as under the old law, registration proves you wrote the program when you say you did. Also, the certificate you get from the copyright office will be presumed valid in any infringement suit you bring. Further, you will be able to recover a certain amount of money even if you can't prove you were damaged (the range was increased under the 1988 amendment to between $500 and $20,000, at the discretion of the judge). Finally, if you win a lawsuit, you will be able to recover your attorney's fees, which can often exceed the amount you are suing for. Registration requires paying a $10 registration fee, sending a written copy of the program (source code), and filling out a form that can be obtained from the Publications Section, LM-455, Copyright Office, Library of Congress, Washington, D.C. 20559. (Or call the "Forms Hotline" at (202) 287-9100 and leave a message with your name and address asking for Form TX). Further information about how and when to register, all of which still applies, is contained in my article in the April 1987 RAINBOW.

The User's Perspective

In my article, "Who's Gonna Know?" published in the July 1987 issue of THE RAINBOW, I looked at the copyright law from the point of view of the user or copier of computer programs. Most of what was said in that article is still true. However, one particular problem requires more discussion now. I pointed out the difficulty of figuring out if a copyrighted work is in the public domain or not. That's no longer difficult: The work is not in the public domain just because there is no notice. For works published after 1988, unless there is specific language by the copyright owner authorizing the making of copies, you have to assume that a work is not in the public domain. The problem now is how to figure out who the copyright owner is, if there is no notice. You can contact the copyright office in Washington to find out if the work has been registered; but if it's not registered, you might have a lot of trouble finding the author.

This won't be too big a problem if most people continue to use the "permissive" copyright notice, as recommended. European and other countries seem to have managed for years without a copyright notice requirement, and I can only assume we will be able to do so too. There may be a little more trouble for users of copyrighted works if notice and registration aren't used, but this is the trade-off we must make for protecting authors against losing their copyrights, perhaps inadvertently.

(Questions or comments about this article may be addressed to the New York Law School, 57 Worth Street, New York, NY 10013. Although Professor Samuels is interested in discussing copyright matters of general interest to computer programmers and users, he is not currently engaged in the practice of law and will not give specific legal advice. If you have a serious copyright problem, you should consult an attorney who specializes in the field.)

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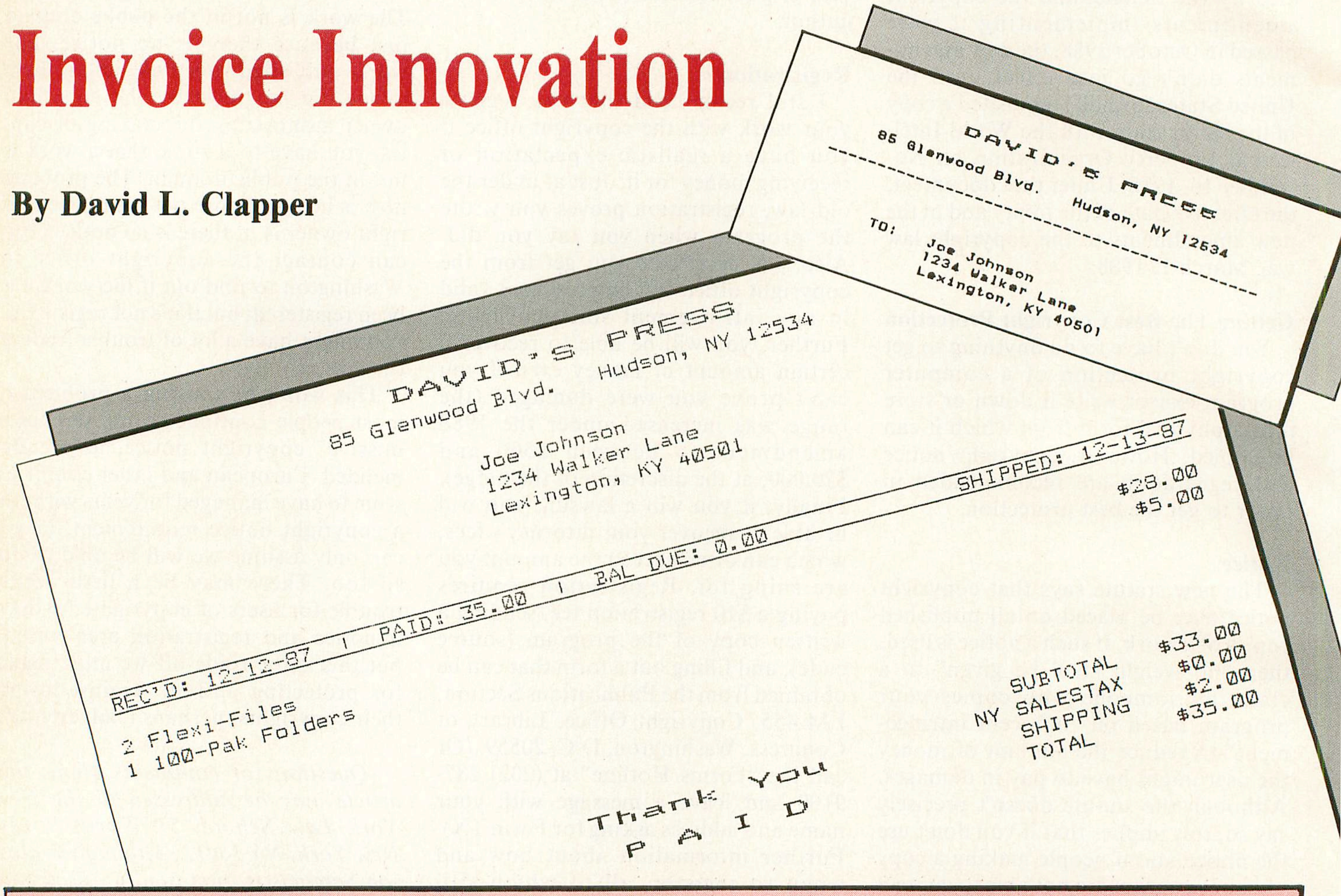

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1 100-Pak Folders                           $5.00
                        SUBTOTAL           $33.00
                     NY SALESTAX            $0.00
                        SHIPPING            $2.00
                           TOTAL           $35.00
Thank You
PAID
```

I had been in the mail-order printing business for more than a year when Santa was kind enough to present me with a brand-new 64K CoCo 2 with disk drive and DMP-105 printer. It wasn't long before I'd tried most of Radio Shack's programs for files and finances and found little that pertained to my small business. *Office* is a simple program I created to make official-looking invoices to enclose with my orders. I have since added options for printing both UPS shipping record forms and package shipping labels.

The program is in BASIC and is menu-driven. Obviously, you will have to substitute the name of your business in lines 30, 150, 440, 1170, 1450 and 1580. If you are required to charge your customers sales tax, Line 350 computes the tax. The combined state and local sales taxes are seven percent for my purposes. You may have to substitute another percentage, depending on where your business is located. The program also uses the customer's state in his address as a flag to decide if the tax will be charged. Line 340 takes care of this. Substitute your state here.

I have included provision for only two purchases since that is the most my customers have printed at one time. You can easily set up more by copying the input routine in lines 300 through 320. Then add appropriate print lines as shown by lines 570 and 580. If necessary, you might even decide to dimension and use an array to hold the products ordered.

The UPS form printer uses the customer's name and address information already entered to print the shipping form. I do have to insert the forms manually into my printer, but I don't have to type or write all that information again.

The package shipping label works the same way. I ususally print it out on regular printer paper, but self-stick labels can easily be used.

Try this program for your invoice printing, and make your small business look like BIG business.

(Questions or comments regarding this program may be directed to the author at 85 Glenwood Blvd., Hudson, NY 12534. Please enclose an SASE when requesting a reply.) ☐

David Clapper is a retired public school music teacher. He now builds church pipe organs and runs a mail-order printing business catering to model railroaders and railroad enthusiasts.

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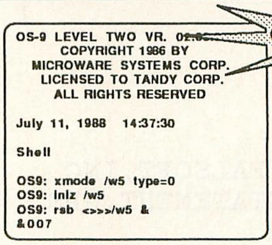


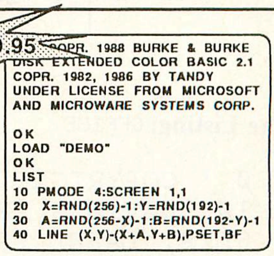
```
OS-9 LEVEL TWO VR. 02.0
      COPYRIGHT 1986 BY
 MICROWARE SYSTEMS CORP.
  LICENSED TO TANDY CORP.
    ALL RIGHTS RESERVED

July 11, 1988   14:37:30

Shell

OS9: xmode /w5 type=0
OS9: inlz /w5
OS9: rsb <>>>/w5 &
&007
```

CLEAR



```
COPR. 1988 BURKE & BURKE
DISK EXTENDED COLOR BASIC 2.1
COPR. 1982, 1986 BY TANDY
UNDER LICENSE FROM MICROSOFT
AND MICROWARE SYSTEMS CORP.

OK
LOAD "DEMO"
OK
LIST
10 PMODE 4:SCREEN 1,1
20  X=RND(256)-1:Y=RND(192)-1
30  A=RND(256-X)-1:B=RND(192-Y)-1
40 LINE (X,Y)-(X+A,Y+B),PSET,BF
```

Burke & Burke's new R.S.B. program gives you a complete, OS9-compatible version of Disk Extended Color BASIC. We've added new software for OS9-style graphics, sound, printer, and disk I/O. The BASIC you know and love is now running under Level 2 OS9 windows!

R.S.B. loads and saves files using OS9's file format, so we've also included utilities to transfer BASIC programs and data files betwen OS9 and BASIC disks. Of course, you can't use R.S.B. to run machine language programs, and some BASIC commands work slightly differently under R.S.B.

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CoCo XT-RTC	$99.95

Handyman's note: A hard disk kit includes a hard drive, cable set, and Western Digital, DTC, Adaptec, or equivalent PC-compatible hard disk controller.

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Install XT-ROM in your CoCo XT hard disk controller's BIOS ROM socket. It automatically boots and reboots OS9 from your hard disk.

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Select among any of two different hard disk boot files, two different floppy boot files, or your BASIC ROM at power-up. XT-ROM gives your system that "professional touch". Great for unattended BBS, home security, or other fail-safe CoCo applications.

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Use "wildcards" with most OS9 commands, or rearrange your directory tree. Features recursive directory searches. A hard disk must! $19.95

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by Kevin Berner

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Burke & Burke Advertisement The RAINBOW April, 1989 (Composite B/W)

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220	98	1070	157
460	176	1330	53
610	167	1570	132
840	88	END	182

The Listing: OFFICE

```
0 ' COPYRIGHT 1989 FALSOFT,INC
10 'DAVID'S PRESS STATEMENT,UPS
SLIP, LABEL PRINTER
20 CLS
30 PRINT:PRINT"      davids press
 office"
40 PRINT:PRINT"      <1> STATEMEN
T"
50 PRINT"      <2> UPS SLIP"
60 PRINT"      <3> PACKAGE LABEL
70 PRINT"      <4> QUIT
80 PRINT:PRINT"      <YOUR CHOI
CE>?
90 AN$=INKEY$
100 ON VAL(AN$) GOTO 120,980,141
0,1800
110 GOTO90
120 CLS
130 PRINT
140 PRINT " ====================
==========="
150 PRINT "      DAVID'S PRESS ST
ATEMENT"
160 PRINT " ====================
==========="
170 INPUT "NAME";N$
180 INPUT "ADDRESS";A$
190 INPUT "CITY ";C$
200 INPUT "STATE";W$
210 INPUT "ZIP";Z$
220 INPUT "DATE REC'D";D$
230 INPUT "AMOUNT PAID: (CK-M0)"
;R$
240 INPUT "BALANCE OWED: ";O$
250 INPUT "DATE SHIPPED";G$
260 INPUT "QUANTITY";Q$
270 INPUT "ITEM";I$
280 INPUT "PRICE";A
290 PRINT USING "$$###.##";A
300 INPUT "2ND QUANTITY";J$
310 INPUT "2ND ITEM";K$
320 INPUT "2ND PRICE";B:PRINT US
ING "$$###.##";B
330 S=(A)+(B):PRINT USING "$$###
.##";S
340 IF W$="NY" THEN 350 ELSE 370
350 M=S*.07
360 PRINT USING"$$###.##";M
370 PRINT"SHIPPING CHARGE Y/N"
380 AN$=INKEY$
390 IF AN$="Y"THEN U=2:GOTO420
400 IF AN$="N" THEN U=0:GOTO 420
410 GOTO 380
420 PRINT USING "$$###.##";U
430 T=S+M+U:PRINT USING"$$###.##
";T
440 PRINT#-2,CHR$(27);CHR$(14);T
AB(14)"DAVID'S PRESS"
450 PRINT#-2,CHR$(27);CHR$(28)
460 PRINT#-2,CHR$(27);CHR$(15);T
AB(22)"85 Glenwood Blvd.   Hudso
n, NY 12534"
470 PRINT#-2,CHR$(27);CHR$(54)
480 PRINT#-2,CHR$(27);CHR$(54)
490 PRINT#-2,TAB(30);N$
500 PRINT#-2,TAB(30);A$
510 PRINT#-2,TAB(30);C$;", ";W$;
" ";Z$
520 PRINT#-2,CHR$(27);CHR$(54)
530 PRINT#-2,CHR$(27);CHR$(54)
535 PRINT #-2,CHR$(27);CHR$(28)
540 PRINT#-2,CHR$(28);CHR$(80);C
HR$(241)
550 PRINT#-2,"REC'D: ";D$;"  ";C
HR$(245);"  PAID: ";R$;"  ";CHR$
(245);"  ";"BAL DUE: ";O$;:PRINT
```

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		with RS-232 Cable*	185
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Reviewed in April, 1988 Rainbow!

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*Coco 1, 2 requires Deluxe RS-232 Pak

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```
#-2,TAB(63) "SHIPPED: ";G$
560 PRINT#-2,CHR$(28);CHR$(80);C
HR$(241)
565 PRINT#-2,CHR$(27);CHR$(54)
570 PRINT#-2,Q$;" ";I$;:PRINT#-2
, TAB(71);" ";:PRINT#-2,USING"$$
###.##";A
575 IF B=0 THEN 590 ELSE 580
580 PRINT#-2,J$;" ";K$;:PRINT#-2
, TAB(71);" ";:PRINT#-2,USING"$$
###.##";B
590 PRINT#-2,""
600 PRINT#-2,""
610 PRINT#-2,CHR$(27);CHR$(54)
620 PRINT#-2,CHR$(27);CHR$(54)
630 PRINT#-2,CHR$(27);CHR$(54)
640 PRINT#-2,TAB(63)"SUBTOTAL ";
:PRINT#-2,USING"$$###.##";S
650 PRINT#-2,TAB(60)"NY SALESTAX
";:PRINT#-2,USING"$$###.##";M
660 PRINT#-2,TAB(63)"SHIPPING ";
:PRINT#-2,USING"$$###.##";U
670 PRINT#-2,TAB(63)"TOTAL    ";
:PRINT#-2,USING"$$###.##";T
680 PRINT#-2,CHR$(27);CHR$(22)
690 PRINT#-2," "
700 CLS
710 PRINT:PRINT "HAS THIS BILL B
EEN PAID? Y/N
720 AN$=INKEY$
730 IF AN$="Y" THEN 760
740 IF AN$="N" THEN 830
750 GOTO 720
760 PRINT#-2,CHR$(27);CHR$(14);T
AB(18)"Thank You"
770 PRINT#-2,CHR$(27);CHR$(28)
780 PRINT#-2,TAB(17)"P A I D"
790 PRINT#-2,CHR$(27);CHR$(15)
800 PRINT#-2,CHR$(27);CHR$(54)
810 PRINT#-2," "
820 PRINT#-2," "
830 PRINT" PRINT SECOND COPY? <Y
> OR <N>"
840 AN$=INKEY$
850 IF AN$="Y" GOTO 440
860 IF AN$="N" GOTO 880
870 GOTO 840
880 CLS
890 PRINT:PRINT"      <1> RETURN T
O MENU"
900 PRINT"      <2> GO TO UPS LABE
L"
910 PRINT"      <3> GO TO PACKAGE
LABEL"
920 PRINT:PRINT"          <YOUR CH
OICE>?
```

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Electronics 17
Electronics 18

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```
930 AN$=INKEY$
940 ON VAL(AN$) GOTO 10,1090,152
0
950 GOTO930
960 M=0
970 GOTO120
980 ' UPS TICKET PRINTER
990 CLS
1000 PRINT "           *********
***"
1010 PRINT "           * UPS SLI
P *"
1020 PRINT "           *********
***"
1030 PRINT "DATE SHIPPED":INPUT
G$
1040 PRINT "NAME":INPUT N$
1050 PRINT "ADDRESS":INPUT A$
1060 INPUT "CITY";C$
1070 INPUT "STATE";W$
1080 INPUT "ZIP";Z$
1090 CLS
1100 PRINT "VALUE":INPUT V$
1110 PRINT "PACKAGE CONTENTS":IN
PUT P$
1120 PRINT:PRINT"      PREPARE P
RINTER"
1130 PRINT:PRINT"   PRESS <P> WH
EN READY
1140 AN$=INKEY$
1150 IF AN$="P" GOTO 1170
1160 GOTO 1140
1170 PRINT #-2,"DAVID'S PRESS
         ";G$
1180 PRINT#-2,"85 GLENWOOD BLVD.
"
1190 PRINT#-2,"HUDSON, NY  12534
"
1200 PRINT#-2,""
1210 PRINT#-2,""
1220 PRINT#-2,N$
1230 PRINT#-2,A$
1240 PRINT#-2,C$;", ";W$;" ";Z$
1250 PRINT#-2,""
1260 PRINT#-2,""
1270 PRINT#-2,""
1280 PRINT#-2,"             ";V$
1290 PRINT#-2,""
1300 PRINT#-2,"    ";P$
1310 CLS
1320 PRINT:PRINT
1330 PRINT"     <1> PRINT MORE U
PS SLIPS"
1340 PRINT"     <2> RETURN TO ME
NU"
1350 PRINT"     <3> GO ON TO PAC
KAGE LABEL"
1360 PRINT"     <4> QUIT"
1370 PRINT:PRINT"   <YOUR CHOICE
>?"
```

Corrections

"Level II Patch for Profile" (Letters To The Editor, February 1989, Page 6): The first patch file listed in the letter should be titled PROPATCH. Also, insert the Line `c 0a e4 27` between the second and third existing lines. The second listing should be called MGTPATCH. Finally, in the command lines section, you should insert the command line `modpatch mgtpatch` just after `load mgt`.

"Program a RAM Disk" (January 1989, Page 110:) The following changes to RAMDISK (Listing 1) will allow the use of the 40-and 80-column screens.

```
60 CLEAR 300,&H7DFF
171 INPUT"DO YOU WANT TO USE 40/
80 COLUMNS (Y/N)";A$
172 IF A$<>"Y" THEN 180
173 DSKI$ 8,17,2,A$,B$
174 MID$(A$,54,2)=STRING$(2,0)
175 DSKO$ 8,17,2,A$,B$
```

"For the Love of Gold" (December 1988, Page 58): The line numbers from 100 on in PROS1 and PROS2 are numbered incorrectly. Instead of by tens, they should increment by one. The best way to correct the problem is to type each program as is. Then renumber them by entering `RENUM 100,100,1`.

"All the Right Moves" (December 1988, Page 116.): Table 1 incorrectly states that Line 49 optionally deletes Line 48. This should read that Line 49 optionally deletes lines 0 through 48.

For quicker reference, Corrections will be posted on Delphi as soon as they are available in the Info on Rainbow topic area of the database. Just type DATA at the CoCo SIG> prompt and INFO at the TOPIC> prompt.

```
1380 AN$=INKEY$
1390 ON VAL(AN$) GOTO 980,10,152
0,1800
1400 GOTO 1380
1410 ' DAVID'S PRESS MAILING LAB
EL
1420 CLS
1430 PRINT:PRINT
1440 PRINT " *******************
***********"
1450 PRINT " * DAVID'S PRESS MAI
LING LABEL*"
1460 PRINT " *******************
***********"
1470 INPUT "NAME";N$
1480 INPUT "ADDRESS";A$
1490 INPUT "CITY";C$
1500 INPUT "STATE";W$
1510 INPUT "ZIP";Z$
1520 CLS
1530 PRINT:PRINT"       PREPARE PR
INTER"
1540 PRINT"     PRESS <P> WHEN RE
ADY"
1550 AN$=INKEY$
1560 IF AN$="P"GOTO1580 ELSE 155
0
1570 GOTO1550
1580 PRINT#-2,CHR$(27);CHR$(14);
"    DAVID'S PRESS"
1590 PRINT#-2,CHR$(27);CHR$(28)
1600 PRINT#-2,CHR$(27);CHR$(15);
"     85 Glenwood Blvd.   Hudson,
 NY 12534"
1610 PRINT#-2,""
1620 PRINT#-2,"---------------
--------------------------"
1630 PRINT#-2,CHR$(27);CHR$(54)
1640 PRINT#-2,""
1650 PRINT#-2,""
1660 PRINT#-2,"        TO:    ";N$
1670 PRINT#-2,"               ";A$
1680 PRINT#-2,"               ";C$;
", ";W$;" ";Z$
1690 PRINT#-2,""
1700 PRINT#-2,""
1710 CLS
1720 PRINT:PRINT
1730 PRINT"      <1> PRINT MORE L
ABELS"
1740 PRINT"      <2> RETURN TO ME
NU"
1750 PRINT"      <3> QUIT"
1760 PRINT:PRINT"    <YOUR CHOICE
>?"
1770 AN$=INKEY$
1780 ON VAL(AN$) GOTO 1410,10,18
00
1790 GOTO 1770
1800 END
```

VIP Writer 1.1

RATED "BEST" IN SEPT '88 "RAINBOW"

VIP Writer has all the features of VIP Writer III described elsewhere in this magazine except the screen widths are 32, 51, 64 & 85. Screen colors are black, green & white, double clock speed is not supported, Spooler and menus are unavailable because of memory limitations. Even so, VIP Writer is the BEST word processor for the CoCo 1 & 2! Version 1.1 includes the configuration program and RGB Hard Disk support. Includes VIP Speller 1.1 DISK $69.95
Available through Radio Shack Express Order Cat. #90-141

Writer owners: upgrade to Writer 1.1 for $20 + $3 S/H. Send only original disk and $23 total.

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VIP Calc 1.1

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VIP Calc has all the features of VIP Calc III described elsewhere in this magazine except the screen widths are 32, 51, 64 & 85. Screen colors are black, green and white, double clock speed and Spooler are not supported. Even so, VIP Calc is the most complete calc for the CoCo 1 & 2! Version 1.1 has faster and more reliable disk access and improved display speed. DISK $59.95

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VIP Database 1.1

"ONE OF THE BEST" JUL '84 "RAINBOW"

VIP Database has all the features of VIP Database III described elsewhere in this magazine except the screen widths are 51, 64 & 85. Screen colors are black, green and white, double clock speed and Spooler are not supported. Even so, VIP Database is the most complete database for the CoCo 1 & 2! Version 1.1 has faster and more reliable disk access and single spaced reports. DISK $49.95

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RAVED ABOUT IN THE APRIL 1983 "RAINBOW"

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What's new on Delphi

CoCo DOS?

By Don Hutchison
CoCo SIG Database Manager

New users frequently ask, "Can I run PC-compatible software on my CoCo?" While that might be nice in some cases, it is not practical to attempt to run PC programs on a CoCo.

The problem is that the CoCo uses a 6809 processor while the PC uses an 8088, 8086, 80286 or 80386 processor. These microprocessors use totally different instruction sets that cannot be translated easily. There are no magic peeks or pokes to remedy the situation, either. While conversions are theoretically possible, the resulting emulation would be much slower than the corresponding software running on a PC.

If source code for a particular program is available, it may be possible to recompile or reassemble the code on the CoCo in order to produce a usable program. However, this is rarely the case except in the area of OS-9 software, where UNIX utilities are frequently available and modifiable for the CoCo.

Actually, many BASIC programs can be converted to run on the CoCo if you are sufficiently determined. BASIC programs in ASCII format can be ported over from one machine to another, where the necessary modifications may be made. Machine-language utilities have been available for the Radio Shack Models I, II and III to enable MS-DOS BASIC programs to be passed between the two machines with the necessary conversions made automatically. However, I know of no such utilities for the CoCo or MS-DOS machines.

Naturally, text files may be freely transferred between the two computer types with no modifications. It's usually only in binary programs that problems arise.

New Forum Software

The forum has been modified to support the following new features:

- New qualifiers `SINCE` and `BEFORE` apply on the `DIRECTORY` and `READ` commands. You can now enter a command such as `READ SINCE DEC 5` to read messages starting with December 5. The syntax of all `READ` and `DIRECTORY` qualifiers has been relaxed so that they can begin with a slash mark (/) and have an equal sign (=) before values. This way, a command such as `DIR/SIN=5-DEC` works just as it does in Mail, and does `READ/NEW`
- If a user has only one accessible topic in the forum, the prompt for the topic in which to save a new message is skipped.
- The default addressee of a message is now shown at the To: prompt enclosed in brackets. This change makes it easier and faster to reply to a forum message.
- More characters are displayed in the subject field of a message in a directory display.

2400-bps Access

When accessing Delphi via 2400 bps and Telenet, be sure to press the "at" (@) symbol and ENTER when your modem connects to Telenet. You will have to type this command blindly since it won't be echoed back to you, but you'll be able to see everything that follows.

Also be sure you access Telenet using the correct local access number for 2400-bps service. Otherwise you will not be able to connect with the service. As usual, there is no surcharge for 2400-bps service while on Delphi.

GETerm Version 2.5

Great news! Version 2.5 of the popular terminal program *GETerm* is now available in the Utilities topic of the CoCo SIG's database. This version of *GETerm* is very similar to the one many have used before. A few bugs have been fixed and a few new features have been added, such as:

- 2400-bps support for the CoCo 3's serial port
- 9600-bps support for the RS232 Pak
- Y- and Xmodem-CRC protocols

Don Hutchison is an electrical engineer and lives in Atlanta, Georgia. He works as a senior project engineer involved in the design of industrial control systems. On Delphi, Don is the Database Manager of the RAINBOW CoCo SIG. His Delphi username is DONHUTCHISON.

Database Report

Even as we begin to think about nice weather and getting outside again, we're still very busy and active on the CoCo SIG. Here's some of the new material people have provided for us this past month.

OS-9 Online

In the Utilities topic of the database, **Jim Hickle** (JIMHICKLE) sent us a new copy utility. **Ronald Cliborne** (COCORON) uploaded a directory utility. **Zack Sessions** (ZACKSESSIONS) posted a C program for use with a RAM disk. **Marc Genois** (MARCGENOIS) posted a disk ID-changer utility. **Roger Krupski** (HARDWAREHACK) uploaded his palette program.

The Patches topic included **Christopher Burke** (COCOXT), who uploaded several utilities for *RSB* users, mostly concerned with better cursor positioning and joystick response.

In the Telcom topic, **Rick Adams** (RICKADAMS) uploaded a graphics interface for the popular Delphi *Othello*-like game, *FlipIt*. Rick's program provides a joystick interface with the game. Originally programmed by Dan Bruns, president of Delphi, it was demonstrated at the Princeton RAINBOWfest.

In the Graphics & Music topic, I (DONHUTCHISON) uploaded the pictures from the February CoCo Gallery. **Glen Hathaway** (HATHAWAY) posted his program *MTMIDI*. **Steve Clark** (STEVECLARK) uploaded Version 2 of his analog clock program. **Mark O'Pella** (MDODELPHI) uploaded his collection of Christmas-related items.

- Direct to/from disk Xmodem and Ymodem file transfers
- longer macros
- definable filter characters

Greg Miller, the program's author, offers a configuration program for a small ($15 to $20) contribution toward his college fund. The configuration program isn't required since the user may always change his terminal parameters by following the built-in menus, but Greg offers the program for the convenience of those who want theirs to be the default values.

Many users have begun using Ymodem file transfers because they are generally faster than Xmodem. (This is not the case if you are plagued with noisy phone lines, however.) To achieve its faster transfer speeds, Ymodem relies on larger block sizes, or *chunks* of data. Where Xmodem would send data to your CoCo in 128-byte chunks, Ymodem sends the data in 1024-byte blocks. It is this reduction in the amount of communications overhead between the blocks that makes Ymodem generally faster than Xmodem. If you consistently experience retries with Ymodem, though, it's unlikely that the transfer time will be decreased — telephone line noise is the usual culprit. In this case, it's probably best to stick with Xmodem, and I might even recommend Xmodem-CRC because of its greater error-detection capablities.

To initiate a Ymodem transfer from Delphi, enter *GETerm*'s Terminal mode, then press CTRL-? to display the menu of options. Relevant commands for new file transfer methods are:

CTRL-7	Ymodem/Xmodem to disk
CTRL-8	Ymodem from disk
CTRL-9	Xmodem from disk

To start a Ymodem transfer from Delphi, enter `YM` at the Action prompt in the database; to use Xmodem protocol, enter `XM`. (Delphi automatically determines if your terminal program wants checksums or CRC error-checking.) Then issue the appropriate control-key command from the table above when Delphi says, "OK, Receive!" and you're on your way.

By the way, after the initial Ymodem transfer Delphi asks if you want to make Ymodem your default file-transfer method. If you enter `YES`, Delphi saves this parameter in your profile. Simply typing `DOW` at the Action prompt in the future will automatically initiate your file transfer in Ymodem protocol.

Delphi and Linefeeds

Several readers have written regarding a funny-looking letter at the start of each line in their buffer after they complete a download. That phenomenon is caused by linefeeds being sent to you from Delphi. Most computers need linefeeds, but our CoCo is one computer that doesn't. In our case, it's okay to tell Delphi not to send them to you. You can do that by entering `/DOW CAR` at any prompt except the Mail prompt. That tells Delphi to skip sending the linefeeds to you, and from then on you'll receive downloads with only carriage returns at line endings. Enter `/SAVE` to make the change to your default setting.

Download Counts

The database software in the CoCo SIG also contains the facility for displaying what's called a *download count*. The download count is simply a count of the number of times a program or file has been downloaded. If you upload a program to the database, the download count is also a measure of how popular your program has been with SIG members. The download count is displayed in the field labeled *Count*; you'll see it whenever you read a description in the database. Frequent uploaders are always proud to be able to watch their programs' download counts grow.

That's about it for this month. We on the Rainbow CoCo SIG hope you'll join us in the fun and excitement online on Delphi! ☐

The Programmers Den topic gave us **Mike Stute** (GRIDBUG), who posted Volume 1 of his *HitchHiker's Guide to C*. **Ken Heist** (MKJ) also posted his C tutorial.

CoCo SIG

In CoCo 3 Graphics I uploaded the pictures from the January and February CoCo Galleries. **Dan Shargel** (TRIUMPH) posted a 1989 calendar for us. **Richard Trasborg** (TRAS) posted an outstanding picture of Santa's daughter as drawn by Mike Trammell. **Ronald Roden** (TREKKER) uploaded three favorite pictures of the *Enterprise*. **Robert Combs** (ROBCOMBS) sent us a line-drawing program. Mike Stute posted a cynical cartoon called "Nicky the Mouse." **Josh Alkire** (HEYDUDE) uploaded several Macintosh pictures. **Bob Workman** (BOBWORKMAN) uploaded a screen dump for the DMP-110 and *Max-10*. **Brian White** (BRIANWHITE) posted more information about *Max-10*. **John Malon** (JOHNLM) uploaded several fine pictures in GIF format.

The Utilities & Applications topic included **Dave Leebrick** (TWINSDADTOO), who uploaded a tax program for 1988. **Matthew Hunt** (MATTHEWHUNT) posted his Hi-Res screen designer program. **Pierre Salvail** (PSALVAIL) uploaded a directory utility program. **Robert Louden** (KURSE) posted his colorization system. **John Borowski** (ROKO) posted a program for generating random passwords. **Merle Kemmerly** (TOOK3) uploaded an FDOS program, while **Eric Parish** (ERICPAR) provided a "fish 'n' sharks" game and a revision to his *Sky and Planets* program. **Don Jereczek** (DONJERE) gave us a financial calculator, and **Donald Schmitz** (DNSCHMITZ) provided a way to use the DMP-130 in IBM mode, as well as some of his favorite electronics programs.

In the Games topic, Matthew Hunt posted a *Warrior King* patch. **Bruce Bell** (BRUCEBELL) gave us Volume 1 of his *Puzzlemania* series. Eric Parish uploaded four of his favorite games, including his popular checker game.

In Classic Graphics, I uploaded the pictures from the January CoCo Gallery. **George McCashin** (GMCC) posted a screen dump program. **Chuck Wiltgen** (ROGERRABBIT) uploaded *Pro-Draw*, a BASIC graphics editor.

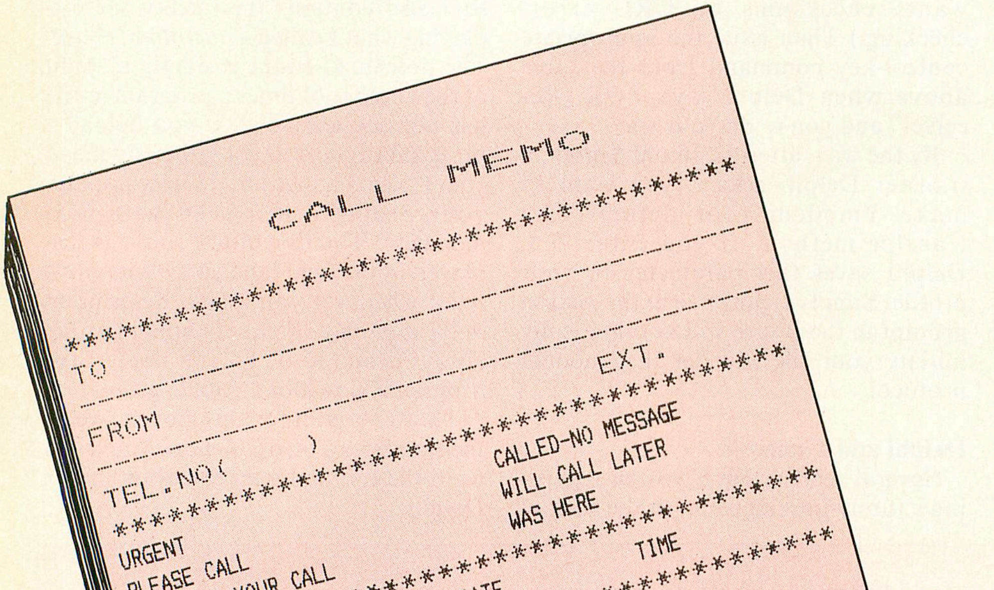
From Music & Sound come **George Hoffman** (HOFFBERGER), who posted his favorite *Lyra* songs, and Don Jereczek, who uploaded several Christmas songs. **Ken Furlow** (SAPPHIRE2) also posted a Christmas *Musica* collection.

In Telecommunications **Bill Haesslein** (BILLH) uploaded a *GETerm* parameter loader program. **Tom Taylor** (TOMMIETAYLOR) posted the *StarBBS* package for you future SysOps.

As you can see, we have some outstanding new software in the database. Join us online on Delphi and get in on the fun!

Now I know I wrote it down — somewhere

Make a Note of It



By William Souser

Ever make a note to yourself as a reminder, only to find later that you've forgotten where you put it? That's what happens when you jot those phone messages down on the corners of napkins and dry-cleaning receipts.

Here's a program that lets you print telephone message notepaper so perhaps you'll be less prone to pitch that important note informing you where to pick up the lottery money, or to realize that you wiped up Mikey's milk with the note stating the tax auditor's date of arrival.

CallMemo was created using a CoCo 2, disk drive, and a DMP-105 printer. Line 130 sets the printer rate to 2400 baud. It can be changed, however, to suit your printer. The printer controls, prefaced by `CHR$(27)` are: `CHR$(14)`, expanded on; `CHR$(15)`, expanded off; `CHR$(20)`, compressed; and `CHR$(19)`, return to standard.

After the title screen, the program prompts for number of copies per page and asks how many pages you want printed. After you answer the prompt, it prints the number of pages asked for.

(Questions or comments regarding this program may be directed to the author at 13 E Hillside Rd., Greenbelt, MD 20770. Please enclose an SASE when requesting a reply.) ☐

William Souser is a 57-year-old self-taught BASIC programmer.

The Listing: CALLMEMO

```
0 ' COPYRIGHT 1989  FALSOFT,INC
10 CLS4:PRINT@135,"
   ";
20 PRINT@167,"      CALL MEMO
";
30 PRINT@199,"           BY
";
40 PRINT@231,"  WILLIAM SOUSER
";
50 PRINT@263,"     COPYRIGHT
";
60 PRINT@295,"      NOV.,1988
";
70 PRINT@327,"
";
80 '*                  *
90 '*******************
100 FOR I=1 TO 2500:NEXTI
110 CLS:PRINT@165,"THIS PRINTS F
OUR CALL":PRINT@200,"MEMOS TO A
PAGE."
120 PRINT@261,"HOW MANY PAGES DO
 YOU":PRINT@296,"WANT TO PRINT";
:INPUTA
130 POKE150,18
140 A$=STRING$(37,42):B$=STRING$
(37,45)
150 FOR H=1 TO A
160 FORI=1TO2
170 PRINT#-2:PRINT#-2,CHR$(27);C
HR$(14);TAB(7)"CALL MEMO
     CALL MEMO":PRINT#-2,CHR$(27
);CHR$(15)
180 GOSUB 340:PRINT#-2,"TO

  TO":GOSUB350
190 PRINT#-2,"FROM
                    FROM":GO
SUB350
200 PRINT#-2,"TEL.NO.(     )
          EXT.          TEL.NO(
)                EXT.      ":GOS
UB340
210 PRINT#-2,CHR$(27);CHR$(20)"U
RGENT                      CALLE
D-NO MESSAGE
     URGENT
         CALLED-NO MESSAGE"
220 PRINT#-2,"PLEASE CALL
          WILL CALL LATER
                    PLEASE CALL
                      WILL CALL
LATER"
230 PRINT#-2,"RETURNED YOUR CALL
         WAS HERE
                    RETURNED YOU
R CALL                 WAS HERE";
:PRINT#-2,CHR$(27);CHR$(19)
240 GOSUB340
250 PRINT#-2,CHR$(27);CHR$(20)"R
ED'D BY                     DATE
              TIME
      REC'D BY
 DATE                TIME";:PRINT#-2
,CHR$(27);CHR$(19)
260 GOSUB340
270 FOR J=1TO 8:PRINT#-2:GOSUB35
0:NEXTJ
280 PRINT#-2
290 NEXT I
300 NEXT H
310 PRINT#-2,CHR$(27);CHR$(19)
320 END
330 REM PRINT SUB ROUTINES
340 PRINT#-2,A$"      "A$:RETURN
350 PRINT#-2,B$"      "B$:RETURN
```

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COCO Q&A CONSULTATIONS

By Marty Goodman
Rainbow Contributing Editor

Torn Apart

I'm having trouble connecting an Atari brand RGB analog monitor to the CoCo 3. I paid a commercial cable maker to devise a cable that would solve the problem, but instead, the image was shifted to the lower-right section of the Lo-Res screen, and unreadably torn apart when I selected a 40-or 80-column Hi-Res screen.

Lonnie McClure
Chattanooga, Tennessee

The problem is that while the R,G and B lines going to the Atari monitor accept the same signal as that produced by the CoCo 3, the horizontal and vertical sync signals expected by the Atari monitor are supposed to be negative (down-going), but the CoCo is sending positive (up-going) H and V sync signals. You must invert both the H and V sync signals as they come out of the CoCo 3 before sending them to the H and V sync pins of the Atari monitor's input.

I recently made such a cable for Lonnie. In order to obtain a source of +5 volts to power the inverter gate used to invert the H and V sync signals, a minor internal modification in the CoCo 3 was required, but after that mod was made, the cable worked perfectly and produced an excellent image on the Atari monitor.

The Great Pretender

I noticed that there are both 720K and 1.44 Meg capacity 3½-inch drives advertised in various computer equipment magazines. The price difference between them is small. . . often as little as $20. Can you advise me whether I should get the 1.44 Meg variety or the 720K variety?

Chuck Cilgen
(ROGERRABBIT)
Dubuque, Iowa

As long as the costs are comparable, I'd say buy the 1.44 Meg variety. Note, however, that you will *not* be able to use them as 1.44 Meg drives if you are hooked up to a normal Radio Shack disk controller. You *can* use the 1.44 Meg drives as if they are 720K drives, and use them with the less expensive 720K-capable diskettes. The 1.44 Meg drives will behave as if they are 720K drives, without compatibility problems.

A single pin on the drive's connector is tied to the ground to put the drive into "720K mode." (The pin is usually automatically grounded when hooking up an ordinary controller and cable.) Only the Frank Hogg Labs Deluxe System (engineered by Bruce Isted) will support the use of 1.44 Meg drives as 1.44 Meg drives. But the system can be used *only* under OS-9 because the floppy-controller portion of the system will not support Radio Shack Disk BASIC.

Down the line the 1.44 Meg-type drives will have a considerably greater resale value, and will be more useable with the current and future crop of MS-DOS engines.

Used and Cheap is Best Bet

I would like to buy one or more floppy-disk drives for my CoCo 3 that can read the standard 35-track single-sided format but offer double-sided 40- or possibly 80-track capability. I'm interested in using them under OS-9. What do you suggest?

Dave Zook
(DAVIDZ)
Chicago, Illinois

You obviously are asking about 5¼-inch size floppies. All 360K (40-track, double-sided, 48-track per inch, 5¼-inch size) "IBM-style" floppies are totally "backward compatible" with the obsolete CoCo 35-track single-sided formats. This compatibility extends to both reads and writes.

When you go to 80-track (96 TPI variety) drives, the picture gets more complicated. There are two completely different types of 80-track 5¼-inch drives. The first is the 720K capacity 80-track drive. It was used under some of the last CPM systems made, and by the Tandy 2000 and some other machines. It is *not* a standard drive in the current MS-DOS engine world. Most are sold used and are very inexpensive. The drive is used by some CoCo OS-9 users because it works nicely with standard Radio Shack type controllers (Radio Shack, HDS, J&M, Disto, etc.). These drives, when driven by proper software, have no trouble reading disks written with 40- or 35-track drives. However, they cannot reliably write to a disk formatted or written by a 35- or 40-track drive. Attempting it risks destroying the information on the disk. Also, because many programs and operating systems do a lot of writing to disk automatically, you need to put write protect tabs on any 40-track diskette you plan to read using an 80-track drive. Note that the 80-track, 5¼-inch drive I am discussing is electronically the same as the (now industry standard) 80-track, 720K, 3½-inch disk drives.

The current industry standard in the MS-DOS engine world for 5¼-inch, 80-track drives is the AT style 1.2 Meg capacity drive. *This* drive is of no use to you because it cannot operate with ordinary Radio Shack style controllers. AT style is more similar in design with double-sided 8-inch drives than with other 5¼-inch or 3½-inch type drives. They even rotate at a different speed from other 5¼-inch drives.

At the Flick of a Switch

I have a Tandy 1000EX and a CoCo 3 hooked to the same DWP-230 printer.

Martin H. Goodman, M.D., a physician trained in anesthesiology, is a longtime electronics tinkerer and outspoken commentator — sort of the Howard Cosell of the CoCo world. On Delphi, Marty is the SIGop of RAINBOW's *CoCo SIG and database manager of OS-9 Online. His non-computer passions include running, mountaineering and outdoor photography. Marty lives in San Pablo, California.*

The 1000EX hooks to the parallel printer port and the CoCo to the serial printer port. When the CoCo is hooked up, I can still use the 1000EX just fine, but when the cable from the 1000EX is hooked up, the serial port will not work. Is there a hardware or software fix for this?

Also what is meant by the term headbanging on disk drives?

Dan Weaver
Amsterdam, New York

The only fix I know of is a hardware one. Buy an A/B printer switch box and a spare cable to hook the output of one side of the box to your printer. These sell for $25-$50 at stores that vend IBM PC / MS-DOS engine accessories. Be sure to buy the box and the cable at the same time, and get connectors on the cable to match the box and the printer. With the switch box you can disconnect your parallel port cable at the flick of a switch.

Headbanging refers to a bug in code in Microsoft's Disk BASIC, resulting in the disk drive's head "getting lost" and slamming into its stops each time you access the disk after a power up or a cold start. The cause is a simple error in the Disk BASIC code. Several people, including myself, wrote Tandy about it when Disk BASIC 1.0 was released but Tandy refused to acknowledge that there was a problem.

Art Flexser solves the problem in his enhanced Disk BASIC ADOS product. Repeated slamming of the head into the stops can damage some drives. The manufacturer's specifications on some makes of disk drive explicitly warn software writers of this danger. The only proper fix for the head-banging bug in Disk BASIC involves buring an EPROM with a modified Disk BASIC code that automatically forces a return to track zero whenever the drive is accessed after a cold start or power up.

For Tinkerers Only

I have a Seikosha serial printer designed for a Commodore computer. It has a six-pin DIN connector on it. Can I hook it to my CoCo 3?

Salvador Flores
Yauco, Puerto Rico

If you are a hardware tinkerer you may succeed in making the hook-up. Commodore type serial ports are different from industry standard RS-232 ports in several respects. You need to make up a circuit board using 1488 and 1489 chips powered by a three voltage power supply (+12, -12, and +5 volts) to do level conversion from the 0 to 5 volt TTL signal levels sent and expected by the Commodore type serial port to the +12 / -12 volt levels expected by the (industry standard) RS-232 type port on the CoCo.

Modify Those Modifications!

I'd like to modify your program in the June 1986 Rainbow for MS-DOS to CoCo conversion to support double-sided drives and sub-directories on the MS-DOS disk. Can you help?

Carey Bloodworth
Swink, Oklahoma

I'm afraid the project amounts to a nearly total rewrite of my program, and would take tens (possibly hundreds) of hours of skilled programming time. My advice to you is to forget about doing that unless you are planning to market it as a commercial product, and instead do one of the following:

(a) Buy *CoCo Util* or *Xenocopy* from Microcom. These two programs run on an MS-DOS machine and provide for conversion to or from CoCo type Disk BASIC disks. *Xenocopy* also supports over 300 other *alien* formats.

(b) Use serial communications to transfer the files. Put the two machines side by side and send the files in question from one to the other using communication programs on both machines and Xmodem and a null modem cable, *or* if the machines are not in the same place, use a telephone line to upload the files in question to your Delphi work space, then download them with the other computer. (Another option is to have a person on each machine,using modems, linking the two machines over the phone line and transfering the file using Xmodem.)

Mix and Match

(1) Can I put a half-height hard drive into the same case with a floppy drive?

(2) Can I partition a hard drive so that I can use it with both Radio Shack Disk BASIC and with OS-9?

(3) Does ADOS-3 allow me to use both 80- and 40-track drives in the same system?

Larry Harris
Clemson, South Carolina

(1) A half-height hard drive will physically fit in the same case with a half-height floppy, but the problem is the power supply. Hard drives usually require considerably more power, especially in the first few seconds,than is required by a floppy drive. Most floppy drive power supplies are unable to operate hard drives, so unless the power supply you are using is designed for the load of a hard drive during start up, it will not work. Either the drive will not function, or it will not work reliably, or the power supply will eventually overheat and burn out.

(2) In an extensive article about hard drive systems, published in the March 1989 issue of RAINBOW, I describe in some detail the support of Disk BASIC and OS-9 by various makers of hard-drive systems. Different hard-drive systems vary in handling the matter of putting Disk BASIC and OS-9 files on the same drives. Currently the software included in or sold as an option with the RGB, Burke and Burke, Disto and Owl-Ware systems allow you to make such partitions. Burke and Burke's *Hyper-I/O* software for Color BASIC and RGB Computer Systems' Color BASIC software for hard-drive systems operate with a variety of different physical hard-drive set-ups, allowing one to mix and match.

(3) ADOS-3 allows some support of 40-track drives when configured as an 80-track system. That is, if you hook a 40-track drive to a system with ADOS-3 that is set up for 80-track drives, you *can* read data written on the disk by other 35- or 40-track drives. Be careful if writing to a disk that is nearly full; you may destroy data. Also, do not use this system to format 35- or 40-track disks, because the `DSKINI` command under an ADOS-3 system configured for 80-tracks will try to format a full 80-tracks, and when it gets beyond 36 or 42 tracks it will start slamming the drive head against its stops. Obviously this is not good for the drive.

Your technical questions are welcomed. Please address them to CoCo Consultations, THE RAINBOW, P.O. Box 385, Prospect, KY 40059.

We reserve the right to publish only questions of general interest and to edit for brevity and clarity. Due to the large volume of mail we receive, we are unable to answer letters individually.

Questions can also be sent to Marty through the Delphi CoCo SIG. From the CoCo SIG> prompt, pick Rainbow Magazine Services, then, at the RAINBOW> prompt, type `ASK` (for Ask the Experts) to arrive at the EXPERTS> prompt, where you can select the "CoCo Consultations" online form which has complete instructions.

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From the workbench of Frank Hogg

April 1989

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Once you get to know it, OS-9 is a great system

OS-9: Time for a Change

By Dennis Skala

I am a frequent visitor to the CoCo and OS-9 SIGs on Delphi. Over the past year, I have noticed a general resistance to OS-9 among the CoCo SIG members. As a confirmed OS-9 user, I find this disturbing. Since I was looking at this from a biased viewpoint, I decided to step back and try to understand this phenomenon. Why do many CoCo users consider OS-9 something to be feared and avoided?

Some CoCo users have little incentive to use or learn OS-9. These are the users who are content using Disk BASIC and do not need OS-9's features. Other users may see advantages in OS-9 but are afraid to make the plunge because they have heard that OS-9 is user-hostile and hard to learn. While OS-9 can indeed be complex, "it ain't necessarily so." Many CoCo users believe that OS-9 is user-hostile when they compare it to Disk BASIC. This is as fair as comparing a 747 to a small stunt plane? Of course the 747 is more difficult to fly, but it is (in most ways) more capable than the stunt plane. However, I doubt that either is inherently more difficult to operate or understand when comparing similar tasks.

Let me begin with the obligatory statement that OS-9 is an operating system — no more, no less. Disk BASIC may be characterized as a pseudo-operating system. It is essentially an extension of the Extended BASIC interpreter command table to include rudimentary disk I/O capability. OS-9 is an operating environment — an interface between you and the computer. Disk BASIC is a language. Both are just software.

Level I vs. Level II

OS-9 Level I has been around for 10 years. It was originally written to provide a powerful operating system for 6809 microcomputers with 64K memory. The system sacrificed user friendliness for the power it gave the 64K machine. Level I keeps few or no utilities in memory in order to maximize the memory available for programs. Commonly used utilities (`Dir`, `Copy`, etc.) are kept on disk and loaded into memory when needed. This makes Level I a little tricky to use — especially with only one disk drive.

Level II's additional memory alleviates most of these difficulties. Most Level II users keep frequently used utilities in memory, which makes it easier to switch disks without causing errors. In addition, Level II windows make multitasking much easier than it is with Level I. Under Level I, it is difficult to run more than one interactive program, and trying to run several programs can make a mess of your screen. Level II windows eliminate this limitation.

Level I comes with an assembler. Many CoCo users bought the package and learned how to navigate the system. However, if they weren't interested in assembly programming, there was little else to do with OS-9 except purchase commercial programs or program languages. Fortunately, Tandy chose to include BASIC09 in the Level II package. More CoCo users are familiar with and interested in BASIC programming than in assembly-language programming. The Level II users can use this system in the same ways they use Disk BASIC. If you're one of those users turned off by Level I, you'll find that Level II is different — it's aimed at the casual user.

The Myth of OS-9 User-Hostility

Let's compare Disk BASIC with OS-9. Table 1 lists all the Disk BASIC commands as presented in Appendix H of Radio Shack's *Color Computer Disk System Owners Manual and Programming Guide*. Next to each command is the OS-9 or BASIC09 equivalent.

The majority of the Disk BASIC commands are not system commands but have to do with handling files and buffers from interpreted BASIC. These commands are compared to the closest applicable OS-9 commands. When comparing the system and file-handling commands, the OS-9 commands seem

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as easy to understand as the corresponding Disk BASIC commands. In fact, BASIC09's file-handling commands are more user-friendly than Disk BASIC's counterparts. BASIC09 lets OS-9 handle file buffers — Disk BASIC requires programmers to manipulate these.

Table 1: Comparison of Disk BASIC, OS-9 and BASIC09 Commands

Disk BASIC	OS-9	BASIC09
`BACKUP 0 TO 1`	`backup /d0 /d1`	.....
`CLOSE #1`	.....	`CLOSE #1`
`COPY "FILE1.EXT:0" TO "FILE2.EXT:1"`	`copy /d0/file1 /d1/file2`	.....
`CVN(A$)`	n/a	n/a (1)
`DIR 0`	`dir /d0`	.....
`DRIVE 1`	`chd /d1`	`CHD /d1`
`DSKINI 0`	`format /d0`	.....
`DSKI$ 0,12,3,M$,N$`	n/a	n/a
`DSKO$ 0,12,3,M$,N$`	n/a	n/a
`EOF(1)`	.....	`EOF (1)`
`FIELD #1,10 AS A$, 12 AS B$`	.....	n/a (1)
`FILES 1,1000`	.....	n/a (1)
`FREE(0)`	`free /d0`	.....
`GET #1,5`	.....	`SEEK #1,5`
`INPUT #1,A$`	.....	`INPUT #1,A$`
`KILL "FILE1.EXT:0"`	`del /d0/file1`	`DELETE /d0/file1`
`LINE INPUT #1,A$`	.....	`READ #1,A$`
`LOAD "FILE1.EXT:0",R`	.....	`LOAD d0/file1` (2)
`LOADM "FILE1.EXT:0",1000`	`load /d0/file1`	.....
`LOC(1)`	.....	n/a (1)
`LOF(1)`	.....	n/a (1)
`LSET A$=B$`	.....	n/a (1)
`MERGE "FILE1.EXT:0",R`	`merge /d0/file1 /d0/file2>/d0/file3`	n/a
`MKN$(1000)`	.....	n/a (1)
`OPEN "D",#1,"FILE1.EXT"`	.....	`OPEN #1,"/d0/file1" ,UPDATE ":0",15`
`PRINT #1,A$`	.....	`PRINT #1,A$`
`PRINT #1, USING "*.*";A`	.....	`PRINT #1 USING "R3.1",A`
`PUT #1,3`	.....	n/a (1)
`RENAME "FILE1.EXT:0" TO "FILE2.EXT:0"`	`rename /d0/file1 file2`	.....
`RSET A$=B$`	.....	n/a (1)
`RUN "FILE1.EXT:0",R`	`/d0/file1`	`RUN procedure`
`SAVE /D0/FILE1.EXT:0",A`	`save /d0/file1 mod1` (3)	`SAVE MOD1 /D0/FILE1` (2)
`SAVEM "FILE1.EXT:0", 1000,2000,1000`	`save /d0/file1 mod1` (3)	`SAVE MOD1 /D0/FILE1` (2)
`UNLOAD 0`	.....	`CLOSE #1`
`VERIFY ON (OFF)`	(4)	.....
`WRITE #1,A$`	.....	`WRITE #1,A$`

Notes:
1. BASIC09 files do not offer field capability and do not use explicit buffers. You can get Disk BASIC field's effect in BASIC09 by using typed variables.
2. These are BASIC09 workspace commands.
3. Supplied with Level I OS-9, but not with Level II.
4. Disk-write verify on or off in OS-9 is contained in the device descriptor, and is not easily modified.
5. n/a means not applicable

Some OS-9 commands are complex. For example, `Dsave` copies whole directories to other directories. This utility is more complex than Disk BASIC. It first acts on a subdirectory or a logical part of a disk file. Then it creates a procedure file, which is piped to another shell. The new shell (a command interpreter) has a different default directory and runs concurrently with the `Dsave` command (multitasking). Disk BASIC doesn't have subdirectories, procedure files, pipes or multitasking. It is not surprising that such a command line would look a little formidable to a Disk BASIC user. However, although a little cryptic, it's entirely logical and understandable when you know the details.

Does the novice OS-9 user need to understand all these technical details to use OS-9 profitably? Of course not. When using `Dsave`, the same effect can be achieved by a series of simple command lines of the following type:

```
  copy  /d0/JUNKDIR/file1  /d1/file1
  copy  /d0/JUNKDIR/file2  /d1/file2
```

(etc.)

This is more tedious but quite straightforward (and it's the only way to do it in Disk BASIC).

Level II's windowing system can be intimidating to the novice. Windows are selected and configured by sending escape sequences to the screen. There are lots of permutations here and lots of details. Who can remember all this stuff? Even worse, who wants to look it up every time you want to set up a window? There is a user-friendly way around this — procedure files.

Procedure (or script) files are ASCII text files containing one or more OS-9 commands. When you type the name of a procedure file, OS-9 reads in the file and executes the commands one by one, just as if you had typed them in. The easiest way to create an OS-9 window is to make a procedure file to do it. Choose your size and favorite colors, get out the manual, look up the command formats and create a procedure file to create a window and start a shell. You only need do this once. Put the file in the root directory on your boot disk, and you're in business. I keep a file called `Window.t80.w7` on my boot disk, which starts an 80-column text window in window `/w7` with black letters on a yellow background and starts a command interpreter. It looks like this:

```
echo Creating 80 column text window
*
* Create a 80 column text window using descriptor /w7
* using black letters on a yellow background
*
wcreate /w7 -s=2 0 0 80 24 2 5 5
iniz /w7
shell i=/w7&
```

Procedure files are a convenient way to do repetitive things involving tedious detail. To start my 80-column text window, I just enter `Window.t80.w7` and let OS-9 take care of the details for me.

Most CoCo users are hobbyists. We tend to use our computers for personal enjoyment. I think there is a tendency to want immediate gratification from each new piece of hardware or software — like a small child who gets a new, very complex, toy and wants to use it to its fullest immediately. Because OS-9 is a more complex piece of software than Disk BASIC, there is a longer learning curve, but the novice can *ease* into OS-9 without knowing every detail. It is possible to learn as you go along. As the novice becomes more proficient, shortcuts can be used, and OS-9 features like pipes and multitasking can be manipulated.

Naturally, there are some basics to learn before using OS-9 — even the novice must be aware of default directories and realize all commands are not necessarily memory-resident. If not in memory, these commands are loaded from disk. There is a search pattern for such loads. From what I have seen on the online forums, about 95 percent of the problems novice OS-9 users have result from not knowing their default directories and not realizing that a command line with a program name needs the program either to be in memory or in the current default execution directory.

OS-9 is more user-friendly than Disk BASIC in several respects. To change the default baud rate of the bit-banger RS-232 printer port to 1200 baud under Disk BASIC, one uses `POKE &H96,&H29`. OS-9 provides a utility to do this task. To do the same under OS-9, just enter `xmode /p baud=3`. The OS-9 command is more straightforward and mnemonic.

OS-9 is also more user-friendly when listing text files. To list the text file `Readme` in the default directory to the screen, just type `list readme`. To list to the printer, type `list readme>/p`. To do the same under Disk BASIC, you must write a BASIC program; or text files must be self printing; or files must be examined with a word processor — rather awkward when compared to the OS-9 `List` command.

Several years ago, I customized my Disk BASIC system based on a series of RAINBOW articles by Colin Stearman, which added several BASIC commands, faster double-sided disk access, etc. This involved considerable assembly programming and burning an EPROM for my disk controller. Customizing my OS-9 system, on the other hand, took a couple of hours and involved no programming or hardware modifications. OS-9 is modular — it is intended to be customized for each user.

One area in which Disk BASIC is more user-friendly than OS-9 is in error reporting. There are fewer Disk BASIC error messages, and they are two-letter mnemonics. OS-9 error messages are numbers, and in a long command line, the error's cause is not always obvious. (The OS-9 `Error` utility will give you an explanation, however.)

OS-9 can be run under the control of *Multi-Vue*, a graphics shell. *Multi-Vue* acts like a visual interface between the user and OS-9. It offers some system control and point-and-click program selection. As an experienced user, I find *Multi-Vue* limiting, but many novice users think it makes the system easier to use. To my knowledge, no similar interface exists for Disk BASIC.

The Pros and Cons of OS-9

For the sake of discussion, let's categorize CoCo users into three groups: Group A uses the machine to play games or run third-party software but does no programming. Group B uses the machine for games and other applications, but also programs — primarily in interpreted BASIC. Group C includes the heavy-duty users. They program in various languages — including assembly — and are familiar with the internal mechanics of the computer.

This is an over-simplified but serviceable split. Group A users will notice no difference between the user-friendliness of OS-9 and Disk BASIC. In either case, these users will just insert disks and follow simple load and execute commands.

Most RAINBOW readers would fall into Group B. Such users should have no problem with BASIC09 or OS-9 software. There are a few difficulties with OS-9 — learning how to properly load modules, learning the commands, etc. However, the speed the user gains may make the system worthwhile.

Group C users will find OS-9 more complex than Disk BASIC — there's more to it. On the other hand, once learned, OS-9 offers a number of benefits to the more advanced programmer. Because it is a true operating system, it offers easy access to low-level services such as legal-name checking, creating directories, and reading/writing to the printer, screen, disk files, etc. These functions are accessed with simple system calls from assembly language or from higher level languages. Moreover, such calls will work on all future upgrades of OS-9 and the CoCo. Advanced Disk BASIC programmers use ROM calls for many of these services. Of the disk-related ROM calls, only the `DSKCON` call is documented. Any other ROM call may or may not work on Disk BASIC upgrades. This means to be entirely safe the Disk BASIC assembly programmer must "re-invent the wheel" within each program. Such details as printing to the screen and reading the keyboard should be contained in each program. This is tedious detail that diverts the programmer's attention from the more important parts of the program.

On the CoCo, high-level languages run more efficiently under OS-9 Level II than under Disk BASIC. Tandy sells a good C compiler (written by Microware, the authors of OS-9) that runs under OS-9. C programs (source code) tend to be quite portable — programs written on the CoCo usually run on other machines with little modification.

One disadvantage to the use of OS-9 is that you give up some measure of control of the machine. The OS-9 programmer must remember that other programs may be running concurrently. Certain restrictions apply to programming techniques (using relative addressing in assembly language for instance). Special tricks, such as writing to two disks at once, cannot be done legally. OS-9 is not a particularly good environment for real-time action games since a program's timing is under OS-9's control rather than the programmer's. Timing may be affected by other things happening concurrently. There are ways of dealing with this, but these tend to "hog" the machine, negating the advantages of OS-9.

The Utility of Multitasking

One of the most useful features of OS-9 is multitasking. As I write this, I have another copy of my word processor running in another window, displaying an outline of this article for reference. When responding to Delphi forum messages, I often display pre-downloaded messages in one window, and compose my replies in another. Also, while downloading a message base from Delphi, rather than just sitting there and waiting for the download to complete (perhaps 10 minutes), I do something in another window. Often when running a program, I forget what filename I wanted to use or some other information I need. Rather than exiting the program, I toggle to another window to get the information. Rather trivial uses of multitasking — but convenient.

Some time ago, I wanted to do some heavy-duty calculations involving graphic displays of some mathematical patterns. These would typically take hours to complete. Without multitasking, I would be denied the use of my machine for this time. As it was, I just started the program, adjusted its priority down a little, and I went on to other tasks. The graphics calculation program proceeded automatically, a bit at a time, whenever the computer wasn't busy doing something else. OS-9 took care of the scheduling automatically, and I wasn't aware that the graphics program was running.

The price of multitasking is surprisingly small. I did some crude timing tests that timed a simple program with several shells (command interpreters) running. So long as each of these was idling (waiting for a key press), there was virtually no measurable difference in the speed of the program. OS-9 is very efficient in this regard — when a program isn't doing anything, it "goes to sleep" and uses almost no CPU time. Of course when more than one program is really doing something, each will slow down accordingly. (After all, you can't get something for nothing.)

Some of the most popular MS-DOS programs are TSR (Terminate-and-Stay-Resident) utilities. MS-DOS users consider these programs convenient. All OS-9 programs have the ability to work this way: Not only will they stay resident, but they may also run concurrently. In addition, although many MS-DOS TSR utilities have compatibility problems, OS-9 works well in this mode because it was designed with this ability.

OS-9 Abilities in Disk BASIC?

OS-9 is just software. Theoretically, anything it does can be duplicated in Disk BASIC. For instance, the OS-9 windowing environment could be re-created under Disk BASIC. However, almost no commercial software would take advantage of it. In fact, many programs would conflict with the windows and crash the machine. Like windows, multitasking is possible under Disk BASIC, but it would be difficult, limited and likely to crash the computer. Disk BASIC is a closed standard system that is difficult to modify. OS-9, on the other hand, is an open, modular standard originally designed to be added to and modified.

A standard software interface like OS-9 gives the CoCo user a future. An upgraded CoCo with different hardware will be able to run current OS-9 software. Programmers can write in the OS-9 environment and be confident their programs will run on future CoCos.

Summary

OS-9 is not more user-hostile than Disk BASIC, but it is more capable — hence more complex. However, when comparing features both systems share, neither seems more or less easy. Novice users can do the same things with OS-9 that are done with Disk BASIC — with the same ease. In addition, as users grow more capable, they can use OS-9 to increase their use of the CoCo.

Disk BASIC is a very usable system that is adequate for running one program at a time. However, OS-9 is the way to go for CoCo users who want to get more from their machines. As the base of OS-9 users increases, more software vendors have the incentive to enter the OS-9 market. This will benefit us all. Of course, moving to OS-9 doesn't mean that you've given up Disk BASIC — it will always be there for you. However, if you're like me, once you get used to OS-9 working with Disk BASIC (or MS-DOS for that matter) is like typing with boxing gloves.

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*** *** *** *** COLOR COMPUTER III SOFTWARE *** *** *** ***

CBASIC III EDITOR/COMPILER

The ULTIMATE Color Computer III BASIC COMPILER!!!

If you want to write fast efficient machine language programs and you don't want to spend the next few years trying to learn how to write them in Assembly language or with a cheap compiler, then CBASIC III is the answer!!!

CBASIC III is the only fully integrated Basic Compiler and Program Editing System available for the Color Computer 3. It will allow you to take full advantage of all the capabilities available in your CoCo-3 including 512K RAM, without having to spend years trying to learn assembly language programming. CBASIC III allows you to create, edit and convert programs from a language you are already familiar with Enhanced Disk Color Basic, into fast efficient machine language programs easily and quickly. CBASIC III supports all the enhanced hardware available in the CoCo-3, including Hi-Res Graphics, & Screen displays, Extended Memory and Interrupts (Keyboard, Timer, Serial & Clock). We even added advanced commands not available in Basic to give you a level of control only avialable to very advanced Machine Language Programmers. Plus we made it exceptionally easy to use, not like some other compilers. CBASIC III is the friendliest and easiest compiler available for the Color Computer III.

CBASIC III is a powerful tool for the Beginner as well as the Advanced Basic or Machine Language programmer. You can write programs without having to worry about the Stack, DP Register, memory allocations and so on, because CBASIC III will handle it for you automatically. For Advanced users, CBASIC III will let you control every aspect of your program, even generating machine code directly in a program easily.

CBASIC III features well over 150 Compiled Basic Commands and Functions that fully support Disk Sequential and Direct access files, Tape, Printer and Screen I/O. It supports ALL the High and Low Resolution Graphics, Sound, Play and String Operations available in Enhanced Color Basic, including Graphics H/GET, H/Put, H/Play and H/DRAW, all with 99.9% syntax compatibility. CBASIC III also supports the built in Serial I/O port with separate programmable printer & serial I/O baud rates. You can send and receive data with easy to use PRINT, INPUT, INKEY, GETCHAR and PUTCHAR commands.

CBASIC makes full use of the powerful and flexible GIMI chip in the Color Computer 3. It will fully utilize the 128K of RAM available and install 2 Ultra Fast Ramdisks if 512K is available, for program Creation, Editing and Compilation. You can easily access all 512K of memory in a Compiled program thru several extended memory commands that can access it in 32K or 8K blocks and single or double bytes.

CBASIC has its own completely integrated Basic Program Editor which allows you to load, edit or create programs for the compiler. It is a full featured editor designed specifically for writing Basic programs. It has block move and copy, program renumbering, automatic line number generation, screen editing, printer control and much more.

The documentation provided with CBASIC III is an 8 1/2 by 11 Spiral Bound book which contains approximatly 120 pages of real information. We went to great lengths to provide a manual that is not only easy to use and understand, but complete and comprehensive enough for even the most sophisticated user.

CBASIC III is the most expensive Color Basic Compiler on the market, and well worth the investment. You can buy a less expensive compiler for your CoCo-3, and then find out how difficult it is to use, or how limited its features are. Then you'll wish you had bought CBASIC III in the first place. Dollar for dollar, CBASIC III gives you more than any other compiler available. If you can find a better CoCo-3 Basic Compiler then buy it!!!

Requires 128K & Disk $149.00

DATAPACK III PLUS V1.1

SUPER SMART TERMINAL PROGRAM

AUTOPILOT & AUTO-LOG PROCESSORS
X-MODEM DIRECT DISK FILE TRANSFER
VT-100 & VT-52 TERMINAL EMULATION

- No lost data even at 2400 Baud on the COCO-3 Serial I/O port.
- 8 Display Formats, 32/40/64/80 columns at 192 or 225 Res.
- 50K Text Buffer when using the Hi-Res Text Display & Disk.
- ASCII & BINARY disk file transfer support via XMODEM.
- Directly record receive data to a disk file (Data Logging).
- VT-100 terminal emulation for VAX, UNIX and other systems.
- VT-100/52 cursor keys, position, insert/delete, PF & Alt. keys.
- Programmable Word Length, Parity, Stop Bits and baud rates.
- Complete Full and Half Duplex operation, with no garbled data.
- 9 Variable length, Programmable Macro Key buffers.
- Programmable Printer rates from 110 to 9600 baud.
- Send Files directly from the Buffer, Macro Keys or Disk.
- Display on Screen or Print the contents of the Buffer.
- Freeze Display & Review information On Line with no data loss.
- Built in Command Menu (Help) Display.
- Built in 2 Drive Ramdisk for 512K RAM support and much more.

Supports: R.S. Modem-Pak & Deluxe RS-232 Pak, even with Disk.

Requires 128K & Disk, $59.95

EDT/ASM III

128/512K DISK EDITOR ASSEMBLER

EDT/ASM III is a Disk based co-resident Text Editor & Assembler. It is designed to take advantage of the new features available in the CoCo-3 with either 128K or 512K of memory. It has 8 display formats from 32/40/64/80 columns by 24 lines in 192 or 225 Resolution, so you use the best display mode whether you are using an RGB or Composite monitor or even a TV for your display. Plus you can select any foreground or background colors or even monochrome display modes. It will even support 512K by adding an automatic 2 drive Ultra Fast Ramdisk for lightning fast assembly of program source code larger than memory. There is also a free standing ML Debug Monitor, to help you debug your assembled programs. EDT/ASM III has the most powerful, easy to use Text Editor available in any Editor/Assembler package for the Color Computer.

- Supports Local and Global string search and/or replace.
- Full Screen line editing with immediate line update.
- Easy to use Single keystroke editing commands.
- Load & Save standard ASCII formatted file formats.
- Block Move & Copy, Insert, Delete, Overtype.
- Create and Edit files larger than memory.

The Assembler portion of EDT/ASM III features include:

- Supports the full 6809 instruction set & cross assembles 6800 code.
- Supports Conditional IF/THEN/ELSE assembly.
- Supports Disk Library file (include) up to 9 levels deep.
- Supports standard Motorola assembler directives.
- Allows multiple values for FCB & FDB directives (unlike R.S. EDT/ASM)
- Allows assembly from the Editor Buffer, Disk or both.

Requires 128K & Disk $59.95

TEXTPRO IV

"The ADVANCED COCO-3 Word Processing System"

- 9 Hi-Res Displays from 58 to 212 columns by 24 lines in 225 Res.
- On Screen Display of Bold, Italic, Underline & Double Width print.
- Up to 8 Proportional Character Sets Supported with Justification.
- Up to 80 Programmable Function Keys & Loadable Function key sets.
- Fully Buffered keyboard accepts data even duiring disk access.
- Autoexecute Startup files for easy printer & system configuration.
- 8 Pre-Defined Printer function commands & 10 Programmable ones.
- Supports Library files for unlimited printing & configurations.
- Disk file record access for Mail Merge & Boiler Plate printing.
- Completely Automatic Justification, Centering, Flush left & right.
- Change indents, margins, line length, etc. anytime in the text.
- Create and Edit files larger than memory, up to a full disk.
- Easily imbed any number of printer format and control codes.
- Built in Ultra Fast 2 drive RAMDISK for 512K support.

TEXTPRO IV is the most advanced word processing system available for the COCO-3, designed for speed, flexability and extensive document processing. It is not like most of the other word processing programs available for the Color Computer. If you are looking for a simple word processor to write letters or other short documents, and never expect to use multiple fonts or proportional spacing, then most likely you'll be better off with one of the other simpler word processors. But, if you want a powerful word processor with extensive document formatting features to handle large documents, term papers, manuals, complex formatting problems and letter writing. then TEXTPRO IV is what your looking for. It works in a totally different way than most word processing programs. It uses simple 2 character abbreviations of words or phrases for commands and formatting information that you imbed directly in your text. There are over 70 different formatting commands you can use without ever leaving the text your working on. There are no time comsuming, and often frustrating menu chases, you are in total control at all times. You can see what the formatted document will look like before a single word is ever printed on your printer. Including margins, headers, footers, page numbers, page breaks, column formatting, justification, and Bold, Italic, Underline, Double Width, Superscript and Subscript characters right on the screen.

TEXTPRO IV can even support LASER PRINTERS with proportional fonts, take a good look at this AD? It was done with TEXTPRO IV on an OKIDATA LASERLINE-6 laser printer!!! All the character sets used on this AD are proportional spaced characters, all centering, justification, and text printing was performed automatically by TEXTPRO IV.

Requires 128K & Disk $89.95

HI-RES III Screen Commander

The DISPLAY you wanted but didn't get on your CoCo-3

- 54 Different Character Sizes available from 14 to 212 cpl.
- Bold, Italic, Underline, Subscript, Superscript and Plain character styles.
- Double Width, Double Height and Quad width characters.
- Scroll Protect form 1 to 23 lines on the screen.
- Mixed Text & Graphics in HSCREEN 3 mode.
- PRINT @ is available in all character sizes & styles.
- Programmable Automatic Key repeat for fast editing.
- Full Control Code Keyboard supported.
- Selectable Character & Background color.
- Uses only 4K of Extended (2nd 64K) or Basic RAM.
- Written in Ultra Fast Machine Language.

HI-RES III will improve the standard display capabilities of the Color Computer 3, even the 40 and 80 column displays have several features missing. For example, you can't use PRINT @ or have different character sizes on the same screen, even when mixing text and graphics with the HPRINT command. Hi-RES III can give you the kind of display you always dreamed about having on your CoCo-3, with a wide variety of display options that you can easily use with your Basic or ML programs.

HI-RES III is totally compatible with Enhanced Color Basic and its operation is invisible to Basic. It simply replaces the normal screen display with an extremely versatile display package. With the full control code keyboard, you can control many of HI-RES III extended functions with just a couple of simple keystrokes.

Requires 128K Tape or Disk $34.95

512K RAMDISK & MEMORY TESTER

RAMDISK is an ALL Machine Language program that will give you 2 ULTRA High Speed Ram Disks in you CoCo-3. It does not need or require the OS-9 operating system. It works with R.S. DOS V1.0 or V1.1 and it is completely compatible with Enhanced Color Disk Basic! Plus it allows your CoCo-3 to run at double speed all the time even for floppy disk access!!! It will not disappear when you press reset like some other ramdisk programs. The MEMORY tester is a fast ML program to test the 512K ram. It performs several bit tests as well as an address test so you know that your 512K of memory is working perfectly.

Requires 512K & Disk $19.95

"The SOURCE III"

DISASSEMBLER & SOURCE CODE GENERATOR

The SOURCE III will allow you to easily Disassemble Color Computer machine language programs Directly from Disk and generate beautiful, Assembler compatible Source code.

- Automatic label generation and allows specifying FCB, FDB and FCC areas.
- Disassemble programs Directly from disk, unlike other disassemblers.
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- Selectable Foreground & Background colors & Printer Baud rates.
- Built in Disk Directory an Kill file commands.
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- Written in Ultra Fast Machine Language.

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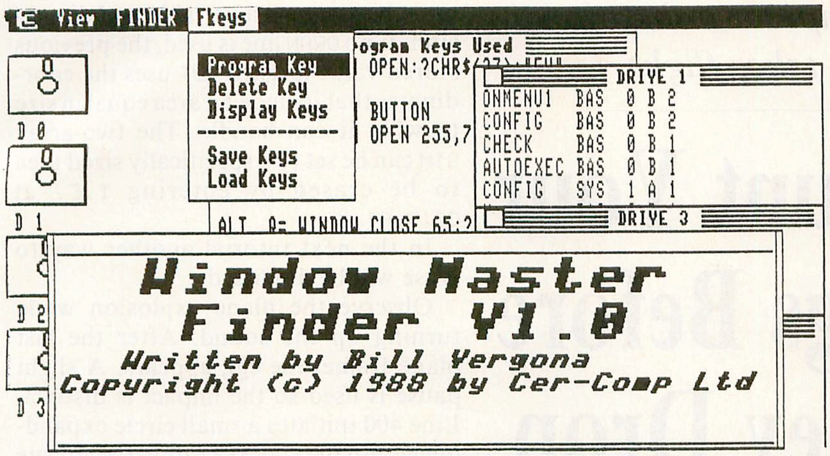
"Window Master"



```
ONMENU1  BAS  0 B 2
CONFIG   BAS  0 B 2
CHECK    BAS  0 B 1
AUTOEXEC BAS  0 B 1
CONFIG   SYS  1 A 1
```

Window Master
Finder V1.0
Written by Bill Vergona
Copyright (c) 1988 by Cer-Comp Ltd

Screen Display Fonts

Window Master supports up to 54 different character sizes on the screen with 5 different character styles. You can have Bold, Italic, Underlined, Super-Script, Sub-script or Plain character styles or any combination of them in any character size. You can also change the text color and background at any time to get really colorful displays.

Fully Basic Compatible

Window Master is fully compatible with Enhanced Color Disk basic with over 50 Commands & functions added to fully support the Point & Click Window System. Window Master does not take any memory away from Basic, so you still have all the Basic Program memory available.

Hi-Resolution Displays

Window Master uses the full potential of the Color Computer 3 display by using the 225 vertical resolution display modes instead of the 192 or 200 resolution modes like most other programs. It uses either the 320/16 color mode or the 640/4 color display to give you the best display resolution possible, and can be switched to either mode at any time.

Mixed Text & Graphics

Window Master fully supports both Text & Graphics displays and even has a Graphics Pen that can be used with HLINE, HCIRCLE, HSET and more. You can change the Pen width & depth and turn it on or off with simple commands. We also added Enhanced Graphics Attributes that allow graphics statements to use And, Or, Xor and Copy modes to display graphic information. With the Graphics enhancements added by Window Master, you could write a "COCOMAX" type program in Basic! In fact we provide a small graphics demo program written in Basic.

Event Processing

Window Master adds a powerful new programming feature to Basic that enables you to do "Real Time" Programming in Basic. It's called Event Trapping, and it allows a program to detect and respond to certain "events" as they occur. You can trap Dialog activity, Time passage, Menu Selections, Keyboard activity and Mouse Activity with simple On Gosub statements, and when the specified event occurs, program control is automatically routed to the event handling routine, just like a Basic Gosub. After servicing the event, the sub-routine executes a Return statement and the program resumes execution at the statement where the event occured.

Enhanced Editing Features

Window Master adds an enhanced editor to Basic that allows you to see what you edit. It allows you to insert & delete by character or word, move left or right a word or character at a time, move to begin or end of line. toggle automatic insert on/off or just type over to replace characters. The editor can also recall the last line entered or edited with a single key stroke. You can even change the line number in line to copy it to a new location in the program.

Disk contains 128K & 512K version of program.

Window Master Features

Multiple Windows

Window Master supports multiple window displays with up to a maximum of 31 windows on the screen. Overlapping windows are supported, and any window can be made active or brought to the top of the screen. Windows can be picked up and moved anywhere on the screen with the mouse. There are 6 different Window styles to choose from and the window text, border and background color is selectable.

Pull Down Menus

Menus are completely programmable with up to 16 menus available. They can be added or deleted at any time in a program. Menu items can be enabled, disabled, checked or cleared easily under program control. Menu selection is automatically handled by Window Master & all you have to do is read a function variable to find out which menu was selected.

Buttons, Icons & Edit Fields

Each Window can have up to 128 buttons, Icons or Edit fields active, if you can fit that many. Buttons, Icons and Edit field selection is handled automatically by Window Master when the mouse is clicked on one. All you have to do is read a Dialog function to find out which Button, Icon, or Edit field was selected, its very simple.

Mouse & Keyboard Functions

Window Master automatically handles the Mouse pointer movement, display and button clicks. It will tell you the current screen coordinate, the local window coordinate, window number the mouse is in, the number of times the button was pressed, which window number it was clicked in and more. The Keyboard is completely buffered, and supports up to 80 programmable Function keys that can contain any kind of information or command sequences you can imagine. You can load and save function key sets at any time. So, you can have special sets of function keys for different tasks. The "Ctrl" key is supported so that you have a full control code keyboard available.

Window Master Applications

Window Master pushs the Color Computer 3 far beyond its normal capabilities, into the world of a "User Friendly" operating enviornment. We are already planning several new programs for use with Window Master. So you don't have to worry about having to write all your own programs. And don't forget that many existing Basic and M.L. programs will run under Window Master with little or no changes. The Possibilities for Application programs are endless: Spread Sheets, Word Processing, Communications, Education, Games, Graphic Design, Desk Top Publishing and on and on.

Hardware Requirements

Window Master requires 512K of memory, at least 1 Disk Drive, a Hi-Res Joystick Interface and a Mouse or Joystick.

Technical Assistance

If you run into difficulty trying to use some of Window Master's features, we will be happy to assist you in any way possible. You can write to us at the address below or call us between 10am and 2pm Pacific Standard Time for a more timely response. Sorry, no collect calls will be accepted.

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Computer animation takes flight

Count Your Eggs Before They Drop

By Joseph Kolar
Rainbow Contributing Editor

Animation is fun to watch and create. This tutorial is an overview of simple animation techniques using GET and PUT. It does not attempt to get into the nitty-gritty of creating program lines but introduces you to the world of CoCo graphics and provides you with the basic knowledge to create your own cartoon.

Let's get started by typing in the listing. First of all, turn down the sound on your computer and notice the effect it has on the screen's action. It looks slower (notice the free-fall) even though it is actually not. Sound enhances animation by helping the action to flow. Notice also that after the air-burst explodes, the bird, plane and ejected egg appear to move simultaneously. Simultaneous action heightens the illusion of motion.

In the last frame only half of the bird is formed to enhance its smooth movement off the screen. The bird continues down after it releases the egg, then up and away. The egg arcs forward, and each time there is greater distance between eggs from frame to frame.

This all sounds trivial but small enhancements make the final product. Experiment to develop something uniquely your own.

I've created several birds and a plane drawn, dimensioned and stored in GET lines. To see these, press BREAK. Add (:SCREEN1,1)to Line 10, and enter Line 60 as 60 GOTO 60. Now run the program.

There are five bird attitudes, two having a shortened wing to add a heightened sense of wheeling. Egg and plane are self-evident. The x is PRESET to make the ejected material different from the bomb. The clustered area in the corner demonstrates that the picture elements can be drawn in an area over which the animation evolves without disrupting the display. The bird dips and releases the egg in the cluttered area.

Restore Line 10 to its original state. Also delete Line 60 by typing DEL60. You may have already notice the similarity between this system and the one used in the GET-PUT tutorial.

S4C1 is the default mode for size and color.

The stationary house is drawn directly at Line 90. Line 50 uses a CIRCLE-PAINT combo to store the egg. Line 30, the DIM line, is reduced to single arrays with a value of 2.

Note DIM C(2). There is a DRAW LINE 52 creating nothing at (10,10), but there is no GET statement to store anything. Nevertheless, using Variable C in the PUT statements erases what we want to get rid of.

Let's investigate. The first instance of using C is in Line 115. Type EDIT115 then press X to extend the line. Press the left arrow until the cursor is under the S in PSET. Type RESET and press ENTER. Then run the program. By changing PSET to PRESET, we change the color to 0. The backgound is in the 2-color mode in PMODE 4.

See the wipe-out area? How big is it? It is the same size area called for in Line 51, which immediately precedes our questionable nothing line.

We told CoCo in Line 115 to put the background overlay at locations (12,12) to (24,18). Masking Line 52 proves we don't need it. What would happen if we yanked DIM C(2) or lowered the value to C(1)? FC Error in 115 would appear on the screen, that's what! So we must dimension C.

As long as we dimension C large enough, the PUT coordinates will determine the size. Doubling the coordinates to 24-by-12 zonks it out. As long as the dimensioned value is large enough, (single array mode), the "nothing" value must be assigned a variable and dimension. If no DRAW line is used, the previous stored value is used. PUT uses the coordinates that include an area equal in size to what it can handle. The two-array DIM can be set to a specifically sized area to be erased by entering I.E. at C(12,6).

In the next tutorial another way to erase will be discussed.

Observe the plane explosion while turning up the sound. After the last plane frame, the egg appears. A slight pause is used so the impact is distinct. Line 400 initiates a small circle expanding within the FOR/NEXT loop to indicate the initial stage of the explosion with a discordant sound. Following is a larger CIRCLE routine at Line 500, simulating an image of a blasted plane.

You don't need to erase this bit of activity because the action phase of the program is terminated at Line 1000 and returned to Line 80. The PCLS in Line 80 does double duty, erasing the explosion and wiping out the scene to be recycled.

Notice the air-burst over the farm complex. The GOSUB routine begins at Line 2000 with the outer rings giving depth to the explosion. The egg accelerates by widening the distance between the objects from frame to frame. For added impact it travels a short distance to strike the target plane.

Because Line 1 reads GOSUB5000, we know the title page was formed after all the artwork was completed. Entering POKE 359,60 puts one letter of text at a time onto the screen, making it look more polished. Entering EXEC 44539 allows you to press any key to continue. Press ENTER.

Entering POKE359 restores normal speed. The reason is that if POKE 359,60 is in force and you press BREAK, the program gets hung up, requiring you to press the reset button to correct it. And, also, if you are deeply engaged in working on the program and you enter LIST, the listing appears one letter at a time. This is of value when reading a listing but frustrating when you are eager to make program changes. You can delete both pokes, but it takes away some of the picture's flair. (Note: Delete POKE 359,60 in Line 5000 to run the title screen on a CoCo 3.)

The listing is straightforward and easy to understand. You may want to research what Lines 50 to 58 consist of

---

Florida-based Joseph Kolar is a veteran writer and programmer who specializes in introducing beginners to the powers of the Color Computer.

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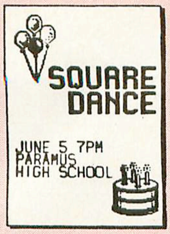
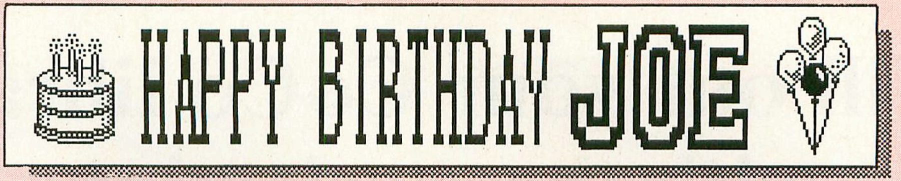
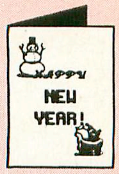
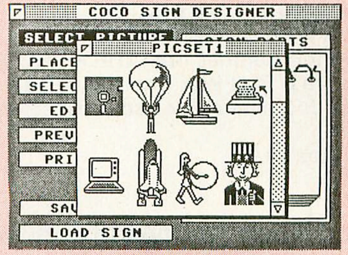






The Coco Graphics Designer Plus $29.95

Super easy-to-use point and click graphical interface, features windows, scroll bars, radio buttons, and joystick or mouse control.



The CoCo Graphics Designer Plus (CGDP) is CoCo 2 and 3 Compatible. It allows pictures, and text in up to 4 sizes and 16 fonts, per page or banner. The cards & signs feature hi-resolution borders and complete on-screen previews. The CGDP comes with 16 borders, 5 fonts, and 32 pictures. It's 100% machine language for fast execution.

Printer Support Radio Shack DMP105, 106, 110,120, 130, 132, 200, 400, 420, 430, 440, 500, Epson FX/RX/LX/EX/LQ, Gemini 10X, Star SG10, NX10, NX1000, Panasonic KXP1080, 1090, 1091, 1092, Prowriter, C. Itoh 8510 & more.. Call for complete list.

Requirements: 64K CoCo II or III, disk drive with RSDOS, mouse or joystick.

Max Compatible

Zebra's Picture disks 2, 3, and 4 include a simple format conversion utility making them easy to use with Colorware's MAX-10, CoCo MAX II and III.

In addition to the font, border, and picture collections that come with the CoCo Graphics Designer Plus, the following optional disks are available for $14.95 each.

Border Disk #1 Contains 176 High resolution borders, great variety from simple to ornate.
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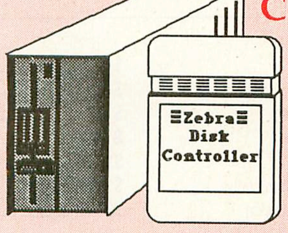
NEW!

Zebra Disk Controller



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Book $19.95, Disk Package $31 (2 disks, book not included)

The Complete Rainbow Guide to OS-9 Level II Vol. I: A Beginners Guide to Windows

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and put an explanatory remark after each `GET` in lines 70 to 79 so you will know what each `PUT` line is doing. Manipulate the lines' coordinates and keep altering them until you get a location that pleases you. I call this freehand programming. You initially locate an object, check it, change and/or relocate, check it again, and when satisfied with the frame, move on to the next. Don't erase the old form but leave it on the screen, even if it distorts a previously set frame. It is much easier to work out movement paths with telltale tracks of the objects on the screen.

Mask the first six `C PUT` lines. Run lines 115, 116, 135, 136, 155 and 156. Now, mask lines 175, 176, 195 and 196 and run the program. The bird distorts frames that it overrides. If the birds in each frame are too far apart, they won't overlap and you lose the birds' slower action as they change direction. Instead, the action is stiff and unrealistic.

Be sure to read the next tutorial for some new ideas. Chances are you will make more elegant birds than this artist.

Here's a final idea to keep you going. Re-enter the following line:

```
53 DRAW"BM13,10M+3,2F2M+1,2M+1,
-2E2M+3,-2"
```

Practice using the M option commands. Use the same-sized canvas for all the objects — *12-by-6* on graph paper. Plot the picture and box it in. Go over it in red. Then, in black, make the bird you displaced by entering `F6E6`. Your new bird in Line 53 has a more gentle and natural curve. Add Line 161 by entering `GOTO 161`. Then run the program. Looks better doesn't it? Plot lines 51, 54, 55, 56 and 57, the half-bird, onto graph paper, making them bend gently. When you get something nice, try it out on your program and replace the old birds with your new and improved ones. □

The Listing: `BIGBIRD`

```
0 '<BIGBIRD>
1 GOTO5000
10 PMODE4,1:PCLS
30 DIM A(2), B(2), C(2), D(2), E
(2), F(2), H(2), J(2), K(2)
50 CIRCLE(3,3),3,3:PAINT(3,3),1,
1
51 DRAW"BM13,0BD6E6F6"
52 DRAW"BM0,10"
53 DRAW"BM13,10F6E6"
54 DRAW"BM0,20F6R6"
55 DRAW"BM0,30R6F6"
56 DRAW"BM24,24F6BU6G6"
57 DRAW"BM30,3E3BR6F3"
58 DRAW"BM50,50 BD5R14BL5G2H2E2U
NUNRNLBDF2"
70 GET(0,0)-(12,6),A,G
71 GET(13,0)-(25,6),B,G
```

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```
72 GET(0,20)-(12,26),E,G
73 GET(0,30)-(12,36),F,G
74 GET(13,10)-(25,16),D,G
75 GET(24,24)-(30,30),H,G
78 GET(50,50)-(64,56),J,G
79 GET(30,0)-(42,3),K,G
80 PCLS:SCREEN1,1
90 DRAW"BM40,191U10R4D6R6U2R2D4R
6U8R2D8R4U4R6D2R2D4"
91 PAINT(42,189),1,1
100 PUT(12,12)-(24,18),E, PSET
110 PUT(12,20)-(24,26),A,PSET
111 GOSUB3000
115 PUT(12,12)-(24,18),C,PSET
116 PUT(12,20)-(24,26),C,PSET
120 PUT(14,18)-(26,24),B,PSET
130 PUT(14,30)-(26,36),A,PSET
131 GOSUB3000
135 PUT(14,18)-(26,24),C,PSET
136 PUT(14,30)-(26,36),C,PSET
140 PUT(18,24)-(30,30),B,PSET
150 PUT(18,42)-(30,48),A,PSET
151 GOSUB3000
155 PUT(18,24)-(30,30),C,PSET
156 PUT(18,42)-(30,48),C,PSET
160 PUT(24,24)-(36,30),D,PSET
170 PUT(22,54)-(34,60),A,PSET
171 GOSUB3000
175 PUT(24,24)-(36,30),C,PSET
176 PUT(22,54)-(34,60),C,PSET
180 PUT(30,26)-(42,32),D,PSET
190 PUT(28,70)-(40,76),A,PSET
191 GOSUB3000
195 PUT(30,26)-(42,32),C,PSET
196 PUT(28,70)-(40,76),C,PSET
200 PUT(36,22)-(48,28),F,PSET
210 PUT(34,90)-(46,96),A,PSET
211 GOSUB3000
215 PUT(36,22)-(48,28),C,PSET
216 PUT(34,90)-(46,96),C,PSET
220 PUT(40,20)-(52,26),D,PSET
230 PUT(42,114)-(54,120),A,PSET
231 GOSUB3000
235 PUT(40,20)-(52,26),C,PSET
236 PUT(42,114)-(54,120),C,PSET
240 PUT(44,16)-(56,22),D,PSET
250 PUT(48,140)-(60,146),A,PSET
251 GOSUB3000
255 PUT(44,16)-(56,22),C,PSET
256 PUT(48,140)-(60,146),C,PSET
260 PUT(48,10)-(60,16),F,PSET
270 PUT(52,175)-(64,181),A,PSET
271 PLAY"O1L80GBDBGDDGBDGB"
275 PUT(48,10)-(60,16),C,PSET
276 PUT(52,175)-(64,181),C,PSET
277 GOSUB2000
280 PUT(54,6)-(66,12),F,PSET
290 PUT(80,150)-(86,156),H,PRESE
T
291 GOSUB4000
295 PUT(54,6)-(66,12),C,PSET
296 PUT(80,150)-(86,156),C,PSET
300 PUT(60,0)-(72,6),B,PSET
305 PUT(150,0)-(164,6),J,PSET
310 PUT(110,110)-(116,116),H,PRE
SET
311 GOSUB4000
315 PUT(60,0)-(72,6),C,PSET
316 PUT(150,0)-(164,6),C,PSET
317 PUT(110,110)-(116,116),C,PSE
T
320 PUT(160,6)-(174,12),J,PSET
321 PUT(66,0)-(78,3),K,PSET
330 PUT(140,70)-(146,76),H,PRESE
T
331 GOSUB4000
335 PUT(160,6)-(174,12),C,PSET
336 PUT(140,70)-(146,76),C,PSET
337 PUT(66,0)-(78,3),C,PSET
340 PUT(170,16)-(184,22),J,PSET
341 PUT(170,40)-(176,46),H,PRESE
T
342 GOSUB4000
345 PUT(170,16)-(184,22),C,PSET
346 PUT(170,40)-(176,46),C,PSET
360 PUT(184,28)-(198,34),J,PSET
361 PUT(186,30)-(192,36),H,PRESE
T
370 GOSUB4000
400 FOR X=1 TO 6
410 CIRCLE(190,32),X,1
411 PLAY"O2V30L32DEG"
420 NEXT X
500 FOR X=10 TO 24STEP2
510 CIRCLE(190,32),X,1
511 PLAY "O1V25L32GED"
520 NEXTX
1000 GOTO80
2000 FOR X=1 TO 6
2001 CIRCLE(56,180),X,1
2002 NEXT
2003 FOR X=9 TO 15 STEP3
2004 CIRCLE(56,180),X,1
2005 NEXT:RETURN
3000 FOR Z=1TO 40:NEXT:RETURN
4000 FORZ=1TO30:NEXT:PLAY"O1V30L
64FACEECAF":RETURN
5000 POKE359,60:CLS:PRINT:PRINT:
PRINT:PRINT"  THE BIG BIRD DROPS
 AN ATOMIC  BIRD EGG ON THE FARM
 COMPLEX.  WHEN IT EXPLODES AN
EGG CARTON  IS HURLED SKYWARD TO
 INTERCEPT  AND DESTROY A PESTIC
IDE-CARRYINGCROP-DUSTER. "
5001 PRINT:PRINT"  PRESS <ENTER>
 TO SEE THIS     TIDBIT IN MOTIO
N. ":EXEC44539:POKE359,126
5002 GOTO10
```

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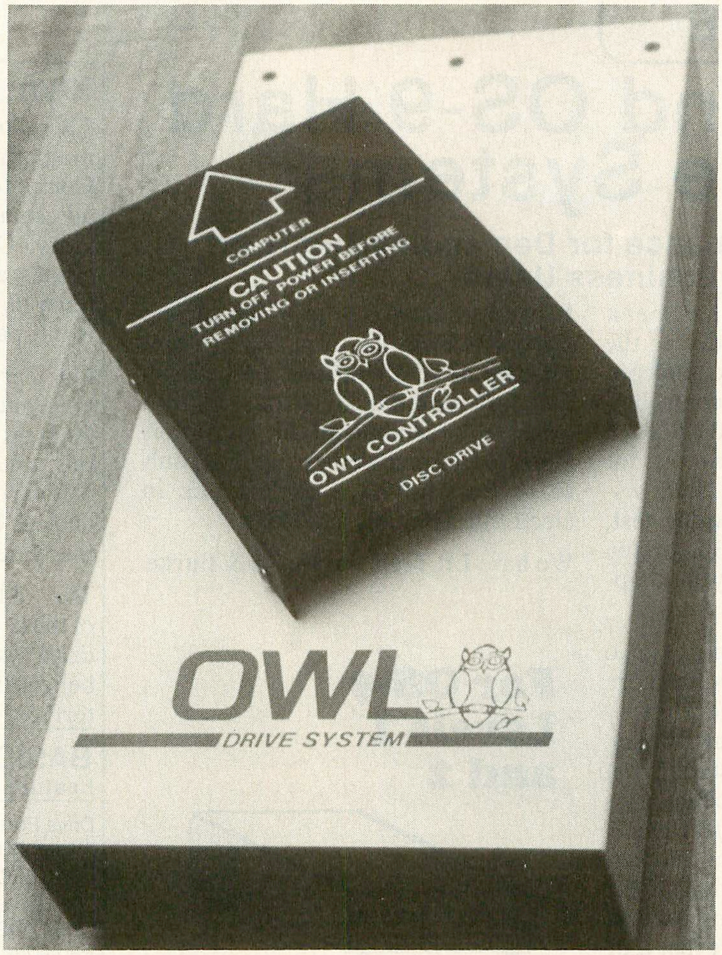

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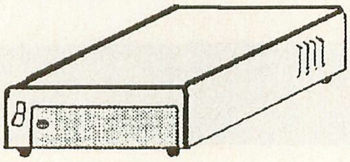

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Built in Park	YES	No
Speed*	FAST	Fast

*All feature details are believed to be true at time of writing and are subject to change. We believe that our BASIC hard drives are the fastest due to our indexing method, but both systems are fast and we sell both. On ours all BASIC commands work including DSKINI, DSKI$, and DSKO$.

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The tenth in a series of tutorials for the beginner to intermediate machine language programmer

Machine Language Made BASIC

Part X: Two-Dimensional Rotation

By William P. Nee

Rotating a point around the screen is a slow but not too complicated process. It mainly involves computing new x and y locations, and machine language is great at using math for doing just that. If we avoid using ROM routines and the FP registers, this process is considerably faster.

In this article we take a point at an old x and y location and revolve it to get a new x and y location. This involves switching to the old location while the new locations are plotted.

The center of the screen (128,96) is the starting point (0,0) for all coordinates. If the angle of rotation is called A, the formulas for a new x_1 and y_1 are as follows:

$$x_1 = x.\cos(a) - y.\sin(a)$$
$$y_1 = x.\sin(a) + y.\cos(a)$$

This rotates the old x,y counterclockwise A degrees to the new x_1,y_1; new x_1,y_1 is `PSET(128+X1,96-Y1)`.

Unfortunately, using sines and cosines slows down a graphics program. The BASIC program at the end of this article gives you an idea of this problem. The more points, the longer the computation time, so we will use an alternative method.

Say our angle of rotation is roughly 7.173 degrees. The sine of 7.173 is about 1/8, and the cosine is about 127/128. Both figures can be calculated quickly by using *shift* commands.

If Register A contains the old x locations then these ML commands will divide the old location by eight and produce the same result as multiplying by the sine:

```
ASRA (Divide by 2)
ASRA (Divide by 4)
ASRA (Divide by 8)
```

This also retains the plus or minus value.

If Register B contains the old y location, then a subroutine like the following will compute the cosine:

```
TFR B,A (Save Y into Register A)
ASRB (Divide by 2)
ASRB (Divide by 4)
ASRB (Divide by 8)
ASRB (Divide by 16)
ASRB (Divide by 32)
ASRB (Divide by 64)
ASRB (Divide by 128)
PSHS B

SUBA ,S+ (the number minus 1/128 of
          the number = 127/128 of the
          number)
```

Register A will contain 127/128 times the old number (the same as the old number times the cosine). Adding and subtracting the results of both operations gives us the new x_1,y_1 locations. Since we use signed numbers, no coordinate can be greater than 127 or less than -128.

However, because we use just one byte for each coodinate, the computer continually rounds off the results and eventually produces a large error. Therefore, we store each coordinate in two bytes; the first byte is the whole number, and the second byte is the two-place decimal. We use only the first byte to `PSET` the point. This means all of our shifts are actually shifts of Register D — remember, a right shift of Register D is `ASRA`, `RORB`. This gives us more than enough accuracy to continue plotting without causing a rounding-off error.

There is also a new way to `PSET` a given point: by converting an x,y location to the byte containing the location and then `PSET`ting the actual bit. Let's see how this is done in `PMODE 4`.

In `PMODE 4` there are 192 rows (0 to 191) of 32 bytes each. (Location $B9 gives the bytes per line for the current `PMODE`). Multiplying the y coordinate by 32 gives you the start of the row containing the byte you want. Add to that the start of the graphics page (in Location $BA/$BB). Next, figure how far over into the row we need to go. The x location can range from 0 to 255, but since there are eight bits to a byte, divide the x location by eight. Adding this to the beginning of the row location gives us the desired byte location.

Bill Nee bucked the "snowbird" trend by retiring to Wisconsin from a banking career in Florida. He spends the long, cold winters writing programs for his CoCo.

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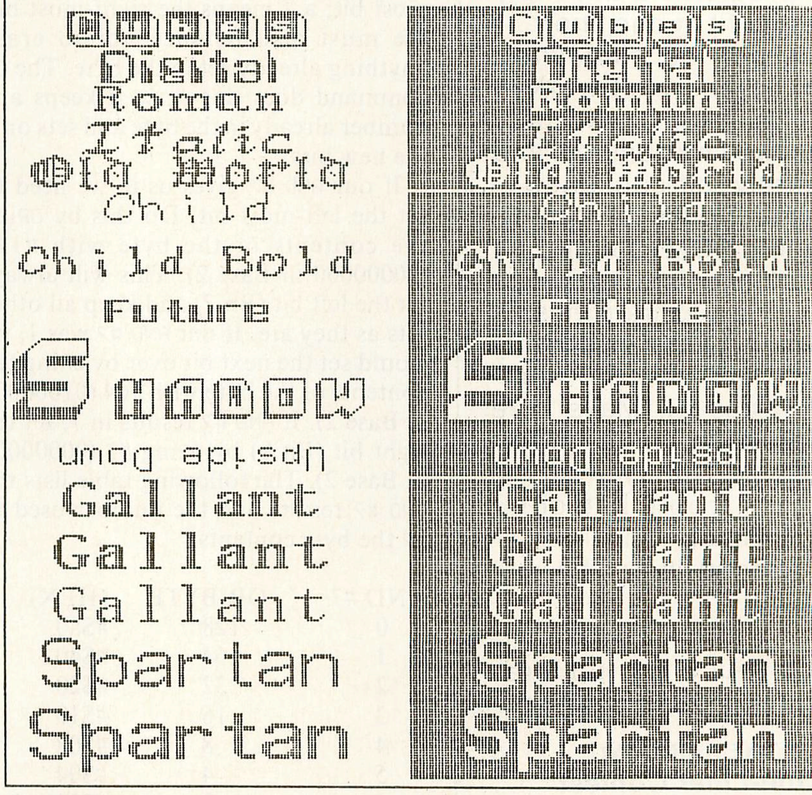

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Send your entry (preferably on cassette or disk) to:

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Let's do that for the center of the screen at 128,96 ($80,$60 in Hex). First, the desired row is Y times 32, or in Hex, $60 times $20, which is $C00. If we are in PMODE 4, without disk, graphics begin at Location $600. Adding $600 to $C00 gives us $1200. The x location is 128, and 128 divided by 8 is 16. So the desired byte is 16 (Hex 10) more bytes. Adding $1200 to $10 gives us $1210. The byte containing Location 128,96 is $1210.

Now, what bit represents the x,y location? Our x location could be 0 to 255, but there are only 8 bits (Bit 7 through Bit 0) in each byte. We need to change our x location to a number between 0 and 7. This is done by AND #7. Any number AND #7 will always be between 0 and 7. A zero means the left-most bit; a 7 means the right-most bit. We must also be sure not to erase anything already set in the byte. The OR command does this since it keeps any number already in the byte and sets only the new bits.

If our AND #7 gives us 0, we need to set the left-most bit. Do this by ORing the contents of the byte with #128 (10000000 in Base 2). This will always set the left bit (Bit 7) and keep all other bits as they are. If our AND #7 was 1, we would set the next bit over by ORing the contents of the byte with #64 (01000000 in Base 2). If AND #7 results in 7, set the right bit (Bit 0) by ORing #1 (00000001 in Base 2). The following table lists the AND #7 results and the number used to OR the byte contents:

AND #7	OR BYTE	(HEX)
0	128	#$80
1	64	#$40
2	32	#$20
3	16	#$10
4	8	#$08
5	4	#$04
6	2	#$02
7	1	#$01

These OR numbers are already stored in the computer starting at $92DD. So all we need to do is load Register A with the x location and ANDA #7; load Register y with #$92DD and load Register B with the contents of the byte (in Register x). Finally, OR Register B with the "A'th" number in the table and put the results (PSET) back into the byte. Let's follow the subroutine all the way through:

```
BYTE  LDA   #$ xx   xx y coordinate
      LDB   #32     bytes per line
      MUL
      ADDD  $BA     add page start (or
                    ADDA $BA)
      TFR   D,X     byte row to Register
                    x
      LDB   #$ xx   xx x location
      LSRB
      LSRB
      LSRB          divide by 8
      ABX           add it to Register x
                    (now has the byte)
BIT   LDA   #$ xx   xx x location
      ANDA  #7      change it to 0
                    through 7
      LDY   #$92DD  OR table location
PSET  LDB   ,X      get current byte
                    contents
      ORB   A,Y     OR B with 0 through
                    7th number of the
                    OR table
      STB   ,X      reload byte with
                    new contents
```

Perform this routine with the computer at $92A6 (PMODE 4/2/0) or at $92C2 (PMODE 3/1) when you execute a PSET command. Follow through these routines in *ZBug* The difference between the two routines is due to the number of bytes per line in each PMODE and because the four-color modes take two bits to set colors. Our program will not need to use locations $BE and $C0 for x and y, and since it is in PMODE 4, we will not need to scale. All of this helps the program to run more quickly.

Start off with the BASIC driver program, which PSETS a series of random dots. Modify this part any way you want — the more complex, however, the longer it will take to compute and run, and the more jumbled it will look on the screen.

The machine language program first checks all the points inside a box from screen locations 65,33 to 191,159. This ensures that no point is more than 63 bits from the center of the screen at 128,96. If a bit is set, its coordinates (x-128,y-96) are stored in a table of coordinates beginning at $5200. The coordinates are stored as two-byte numbers and as each pair is stored, the count location increases by one. Depending on how many points you set, this section may take several seconds.

The program then sets up graphics Page 5. We do not have to specify the PMODE or color set since the BASIC driver program did that for us. LOOP5 will load Stack U with a scratch-pad beginning at $7000. Then it loads Register X with the start of the coordinate table at $5200 and loads Register D with the number of dots to be set, which is also put in COUNT1. LOOP3 to GET computes all of the new x_1,y_1 rotated coordinates and puts them back as two-byte numbers. `GET` to `FINISH` restores the counter and `PSET`s all of the coordinates as:

```
(128-X1,96-Y1),(128-Y1,96-X1)
(128-X1,96+Y1),128-Y1,96+X1)
(128+X1,96-Y1),(128+Y1,96-X1)
(128+X1,96+Y1),(128+Y1,96+X1)
```

The video screen now allows you to see the new dots while new x_1,y_1 locations are being plotted to continue the cycle. Pressing any key breaks the program and returns you to BASIC. It's a long program, but thanks to the Color Computer's ability, it executes with amazing speed. That's 320 dot coordinates being computed and plotted with every pass! ☐

Listing 1: `DEMO`

```
10 REM DEMO PROGRAM
20 PCLEAR8:PMODE 4,1:PCLS:SCREEN
 1,1:ND=4
30 DIM X(ND),Y(ND)
40 FOR N=0 TO ND
50 X(N)=RND(63):Y(N)=RND(X(N))
60 PSET(128+X(N),96-Y(N)):NEXT
70 PMODE ,5:PCLS:GOSUB 100:SCREE
N 1
80 PMODE ,1:PCLS:GOSUB 100:SCREE
N 1
90 GOTO 70
100 FOR N=0 TO ND:A=X(N):B=Y(N)
110 X(N)=A*127/128-B/8
120 Y(N)=A/8+B*127/128
130 NEXT
140 FOR N=0 TO ND
150 PSET(128-X(N),96-Y(N)):PSET(
128-Y(N),96-X(N))
160 PSET(128-X(N),96+Y(N)):PSET(
128-Y(N),96+X(N))
170 PSET(128+X(N),96-Y(N)):PSET(
128+Y(N),96-X(N))
180 PSET(128+X(N),96+Y(N)):PSET(
128+Y(N),96+X(N))
190 NEXT:RETURN
```

Listing 2: `DRIVER`

```
10 REM DRIVER PROGRAM
20 PCLEAR 8:CLEAR200,&H4F00-1
30 PMODE 4,1:PCLS:SCREEN 1,1
40 FOR N=0 TO 40:'NUMBER OF DOTS
50 X=RND(63):Y=RND(X)
60 PSET(128+X,96-Y)
70 NEXT
80 EXEC &H4F00
```

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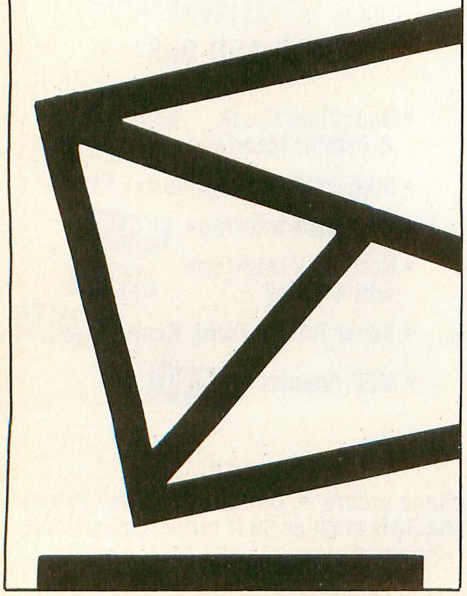

Listing 3: ROTATION

```
4F00                00100        ORG    $4F00
4F00 CC   5200      00110 START  LDD    #$5200
4F03 FD   5107      00120        STD    COORD
4F06 CC   0000      00130        LDD    #0
4F09 FD   5109      00140        STD    COUNT
4F0C 86   21        00150        LDA    #33      Y START
4F0E 97   C0        00160 LOOP2  STA    $C0
4F10 C6   41        00170        LDB    #65      X START
4F12 D7   BE        00180 LOOP1  STB    $BE
4F14 BD   933C      00190        JSR    $933C    PPOINT(X,Y)
4F17 BD   B3ED      00200        JSR    $B3ED    RESULTS TO REGISTER D
4F1A 5D             00210        TSTB            IS THE POINT SET?
4F1B 27   1D        00220        BEQ    CONT
4F1D 96   BE        00230 STORE  LDA    $BE
4F1F 80   80        00240        SUBA   #128     X DISTANCE FROM SCREEN CENTER
4F21 5F             00250        CLRB
4F22 BE   5107      00260        LDX    COORD
4F25 ED   81        00270        STD    ,X++     STORE 2-BYTE X COORDINATE
4F27 86   60        00280        LDA    #96
4F29 90   C0        00290        SUBA   $C0      Y DISTANCE FROM SCREEN CENTER
4F2B 5F             00300        CLRB
4F2C ED   81        00310        STD    ,X++     STORE 2-BYTE Y COORDINATE
4F2E BF   5107      00320        STX    COORD
4F31 FC   5109      00330        LDD    COUNT
4F34 C3   0001      00340        ADDD   #1       ONE MORE POINT
4F37 FD   5109      00350        STD    COUNT
4F3A D6   BE        00360 CONT   LDB    $BE
4F3C 5C             00370        INCB
4F3D C1   BF        00380        CMPB   #191     REACHED MAXIMUM X COORDINATE?
4F3F 23   D1        00390        BLS    LOOP1
4F41 96   C0        00400        LDA    $C0
4F43 4C             00410        INCA
4F44 81   9F        00420        CMPA   #159     REACHED MAXIMUM Y COORDINATE?
4F46 23   C6        00430        BLS    LOOP2
4F48 C6   05        00440 PAGE5  LDB    #5
4F4A BD   9653      00450        JSR    $9653
4F4D BD   9542      00460        JSR    $9542    PCLS
4F50 8D   1B        00470        BSR    LOOP5
4F52 C6   01        00480        LDB    #1
4F54 BD   95AA      00490        JSR    $95AA
4F57 C6   01        00500 PAGE1  LDB    #1
4F59 BD   9653      00510        JSR    $9653
4F5C BD   9542      00520        JSR    $9542    PCLS
4F5F 8D   0C        00530        BSR    LOOP5
4F61 C6   01        00540        LDB    #1
4F63 BD   95AA      00550        JSR    $95AA
4F66 AD   9F A000   00560        JSR    [$A000]  ANY INPUT?
4F6A 27   DC        00570        BEQ    PAGE5    IF NOT, REPEAT
4F6C 39             00580        RTS             END OF THE PROGRAM
4F6D CE   7000      00590 LOOP5  LDU    #$7000   START OF "SCRATCH PAD"
4F70 8E   5200      00600        LDX    #$5200
4F73 FC   5109      00610        LDD    COUNT
4F76 FD   510B      00620 LOOP3  STD    COUNT1   TEMPORARY COUNTER
4F79 EC   84        00630        LDD    ,X       OLD 2-BYTE X COORDINATE
4F7B ED   C4        00640        STD    ,U
4F7D ED   44        00650        STD    4,U
4F7F 47             00660        ASRA            REGISTER D / 128
4F80 56             00670        RORB
4F81 47             00680        ASRA
4F82 56             00690        RORB
4F83 47             00700        ASRA
4F84 56             00710        RORB
4F85 47             00720        ASRA
4F86 56             00730        RORB
4F87 47             00740        ASRA
4F88 56             00750        RORB
4F89 47             00760        ASRA
4F8A 56             00770        RORB
4F8B 47             00780        ASRA
4F8C 56             00790        RORB
4F8D ED   42        00800        STD    2,U
4F8F EC   C4        00810        LDD    ,U
4F91 A3   42        00820        SUBD   2,U
4F93 ED   C4        00830        STD    ,U
4F95 EC   02        00840        LDD    2,X      OLD 2-BYTE Y COORDINATE
4F97 47             00850        ASRA            REGISTER D / 8
4F98 56             00860        RORB
4F99 47             00870        ASRA
4F9A 56             00880        RORB
4F9B 47             00890        ASRA
4F9C 56             00900        RORB
4F9D ED   42        00910        STD    2,U
```

```
4F9F EC    C4       00920        LDD    ,U
4FA1 A3    42       00930        SUBD   2,U
4FA3 ED    81       00940        STD    ,X++     ROTATED 2-BYTE X COORDINATE
4FA5 EC    84       00950 NEWY   LDD    ,X       OLD 2-BYTE Y COORDINATE
4FA7 ED    46       00960        STD    6,U
4FA9 ED    48       00970        STD    8,U
4FAB EC    44       00980        LDD    4,U
4FAD 47             00990        ASRA            REGISTER D / 8
4FAE 56             01000        RORB
4FAF 47             01010        ASRA
4FB0 56             01020        RORB
4FB1 47             01030        ASRA
4FB2 56             01040        RORB
4FB3 ED    44       01050        STD    4,U
4FB5 EC    48       01060        LDD    8,U      OLD 2-BYTE Y COORDINATE
4FB7 47             01070        ASRA            REGISTER D / 128
4FB8 56             01080        RORB
4FB9 47             01090        ASRA
4FBA 56             01100        RORB
4FBB 47             01110        ASRA
4FBC 56             01120        RORB
4FBD 47             01130        ASRA
4FBE 56             01140        RORB
4FBF 47             01150        ASRA
4FC0 56             01160        RORB
4FC1 47             01170        ASRA
4FC2 56             01180        RORB
4FC3 47             01190        ASRA
4FC4 56             01200        RORB
4FC5 ED    48       01210        STD    8,U
4FC7 EC    46       01220        LDD    6,U
4FC9 A3    48       01230        SUBD   8,U
4FCB E3    44       01240        ADDD   4,U
4FCD ED    81       01250        STD    ,X++     ROTATED 2-BYTE Y COORDINATE
4FCF FC    510B     01260        LDD    COUNT1
4FD2 83    0001     01270        SUBD   #1       DECREASE TEMPORARY COUNTER
4FD5 1026  FF9D     01280        LBNE   LOOP3
4FD9 CE    5200     01290 GET    LDU    #$5200   COORDINATE START
4FDC FC    5109     01300        LDD    COUNT
4FDF FD    510B     01310 LOOP6  STD    COUNT1   TEMPORARY COUNTER
4FE2 86    60       01320 POINT1 LDA    #96
4FE4 A0    42       01330        SUBA   2,U      ROTATED Y COORDINATE
4FE6 C6    20       01340        LDB    #32      BYTES PER LINE
4FE8 3D             01350        MUL
4FE9 9B    BA       01360        ADDA   $BA      GRAPHICS START
4FEB 1F    01       01370        TFR    D,X      REGISTER D TO REGISTER X
4FED E6    C4       01380        LDB    ,U       ROTATED X COORDINATE
4FEF CB    80       01390        ADDB   #128     ACTUAL X COORDINATE ON SCREEN
4FF1 54             01400        LSRB            8 BITS PER BYTE
4FF2 54             01410        LSRB
4FF3 54             01420        LSRB
4FF4 3A             01430        ABX             REGISTER X=BYTE
4FF5 A6    C4       01440 BIT1   LDA    ,U       ROTATED X COORDINATE
4FF7 8B    80       01450        ADDA   #128     ACTUAL X COORDINATE ON SCREEN
4FF9 84    07       01460        ANDA   #7       CONVERT TO A NUMBER 0 - 7
4FFB 108E  92DD     01470        LDY    #$92DD   OR TABLE LOCATION IN ROM
4FFF E6    84       01480        LDB    ,X       GET BYTE CURRENT CONTENTS
5001 EA    A6       01490        ORB    A,Y      OR IT WITH OR TABLE
5003 E7    84       01500        STB    ,X       PSET NEW BYTE CONTENTS
5005 A6    42       01510 POINT2 LDA    2,U
5007 8B    60       01520        ADDA   #96
5009 C6    20       01530        LDB    #32
500B 3D             01540        MUL
500C 9B    BA       01550        ADDA   $BA
500E 1F    01       01560        TFR    D,X
5010 E6    C4       01570        LDB    ,U
5012 CB    80       01580        ADDB   #128
5014 54             01590        LSRB
5015 54             01600        LSRB
5016 54             01610        LSRB
5017 3A             01620        ABX
5018 A6    C4       01630 BIT2   LDA    ,U
501A 8B    80       01640        ADDA   #128
501C 84    07       01650        ANDA   #7
501E 108E  92DD     01660        LDY    #$92DD
5022 E6    84       01670        LDB    ,X
5024 EA    A6       01680        ORB    A,Y
5026 E7    84       01690        STB    ,X
5028 86    60       01700 POINT3 LDA    #96
502A A0    42       01710        SUBA   2,U
502C C6    20       01720        LDB    #32
502E 3D             01730        MUL
502F 9B    BA       01740        ADDA   $BA
5031 1F    01       01750        TFR    D,X
5033 C6    80       01760        LDB    #128
```

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(419) 389-1515

```
5035 E0    C4      01770         SUBB  ,U
5037 54            01780         LSRB
5038 54            01790         LSRB
5039 54            01800         LSRB
503A 3A            01810         ABX
503B 86    80      01820 BIT3    LDA   #128
503D A0    C4      01830         SUBA  ,U
503F 84    07      01840         ANDA  #7
5041 108E  92DD    01850         LDY   #$92DD
5045 E6    84      01860         LDB   ,X
5047 EA    A6      01870         ORB   A,Y
5049 E7    84      01880         STB   ,X
504B A6    42      01890 POINT4  LDA   2,U
504D 8B    60      01900         ADDA  #96
504F C6    20      01910         LDB   #32
5051 3D            01920         MUL
5052 9B    BA      01930         ADDA  $BA
5054 1F    01      01940         TFR   D,X
5056 C6    80      01950         LDB   #128
5058 E0    C4      01960         SUBB  ,U
505A 54            01970         LSRB
505B 54            01980         LSRB
505C 54            01990         LSRB
505D 3A            02000         ABX
505E 86    80      02010 BIT4    LDA   #128
5060 A0    C4      02020         SUBA  ,U
5062 84    07      02030         ANDA  #7
5064 108E  92DD    02040         LDY   #$92DD
5068 E6    84      02050         LDB   ,X
506A EA    A6      02060         ORB   A,Y
506C E7    84      02070         STB   ,X
506E 86    60      02080 POINT5  LDA   #96
5070 A0    C4      02090         SUBA  ,U
5072 C6    20      02100         LDB   #32
5074 3D            02110         MUL
5075 9B    BA      02120         ADDA  $BA
5077 1F    01      02130         TFR   D,X
5079 E6    42      02140         LDB   2,U
507B CB    80      02150         ADDB  #128
507D 54            02160         LSRB
507E 54            02170         LSRB
507F 54            02180         LSRB
5080 3A            02190         ABX
5081 A6    42      02200 BIT5    LDA   2,U
5083 8B    80      02210         ADDA  #128
5085 84    07      02220         ANDA  #7
5087 108E  92DD    02230         LDY   #$92DD
508B E6    84      02240         LDB   ,X
508D EA    A6      02250         ORB   A,Y
508F E7    84      02260         STB   ,X
5091 A6    C4      02270 POINT6  LDA   ,U
5093 8B    60      02280         ADDA  #96
5095 C6    20      02290         LDB   #32
5097 3D            02300         MUL
5098 9B    BA      02310         ADDA  $BA
509A 1F    01      02320         TFR   D,X
509C E6    42      02330         LDB   2,U
509E CB    80      02340         ADDB  #128
50A0 54            02350         LSRB
```

```
50A1 54            02360         LSRB
50A2 54            02370         LSRB
50A3 3A            02380         ABX
50A4 A6    42      02390 BIT6    LDA   2,U
50A6 8B    80      02400         ADDA  #128
50A8 84    07      02410         ANDA  #7
50AA 108E  92DD    02420         LDY   #$92DD
50AE E6    84      02430         LDB   ,X
50B0 EA    A6      02440         ORB   A,Y
50B2 E7    84      02450         STB   ,X
50B4 86    60      02460 POINT7  LDA   #96
50B6 A0    C4      02470         SUBA  ,U
50B8 C6    20      02480         LDB   #32
50BA 3D            02490         MUL
50BB 9B    BA      02500         ADDA  $BA
50BD 1F    01      02510         TFR   D,X
50BF C6    80      02520         LDB   #128
50C1 E0    42      02530         SUBB  2,U
50C3 54            02540         LSRB
50C4 54            02550         LSRB
50C5 54            02560         LSRB
50C6 3A            02570         ABX
50C7 86    80      02580 BIT7    LDA   #128
50C9 A0    42      02590         SUBA  2,U
50CB 84    07      02600         ANDA  #7
50CD 108E  92DD    02610         LDY   #$92DD
50D1 E6    84      02620         LDB   ,X
50D3 EA    A6      02630         ORB   A,Y
50D5 E7    84      02640         STB   ,X
50D7 A6    C4      02650 POINT8  LDA   ,U
50D9 8B    60      02660         ADDA  #96
50DB C6    20      02670         LDB   #32
50DD 3D            02680         MUL
50DE 9B    BA      02690         ADDA  $BA
50E0 1F    01      02700         TFR   D,X
50E2 C6    80      02710         LDB   #128
50E4 E0    42      02720         SUBB  2,U
50E6 54            02730         LSRB
50E7 54            02740         LSRB
50E8 54            02750         LSRB
50E9 3A            02760         ABX
50EA 86    80      02770 BIT8    LDA   #128
50EC A0    42      02780         SUBA  2,U
50EE 84    07      02790         ANDA  #7
50F0 108E  92DD    02800         LDY   #$92DD
50F4 E6    84      02810         LDB   ,X
50F6 EA    A6      02820         ORB   A,Y
50F8 E7    84      02830         STB   ,X
50FA 33    44      02840         LEAU  4,U
50FC FC    510B    02850 FINISH  LDD   COUNT1
50FF 83    0001    02860         SUBD  #1
5102 1026  FED9    02870         LBNE  LOOP6      ALL DONE YET?
5106 39            02880         RTS
5107               02890 COORD   RMB   2
5109               02900 COUNT   RMB   2
510B               02910 COUNT1  RMB   2
           4F00    02920         END   START

00000 TOTAL ERRORS
```

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Century 24 Digital 24
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Athens 18 Thames 18 Hollow 18
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And 19 More! See "The Works" ad on page 19.
Note: Actual font size is 40% larger than shown here. COLORWARE

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NOVICES NICHE

THE RAINBOW is a teaching environment and we realize that the majority of our readers will always be beginners. In our continuing effort to always keep the new user in mind, and in addition to the many beginner feature articles and programs published in every issue, "Novices Niche" contains shorter BASIC program listings that entertain as well as help the new user gain expertise in all aspects of the Color Computer: graphics, music, games, utilities, education, programming, etc.

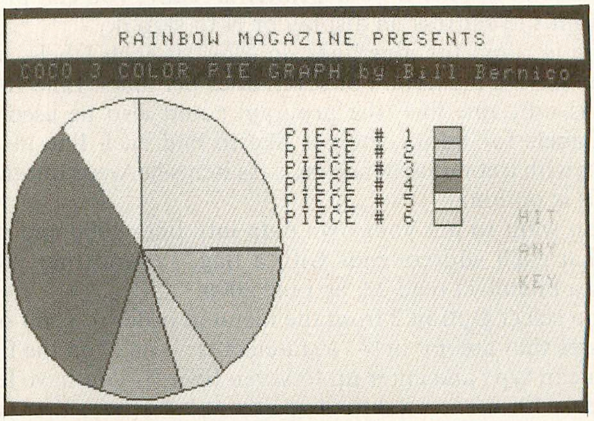
Business

Pieces of the Pie

CoCo 3

By Bill Bernico

Turn your ordinary presentations into lively and colorful displays with *CC3Graph*, a pie chart generator. Pie charts are about the best graphic devices around to help in visualizing ratios and proportions, and they're useful in education as well as business. *CC3Graph* generates charts of up to 16 elements or pieces (16 because each slice of the pie is a different color — one for each PALETTE color). The program is user-prompted, so just type it in and follow the onscreen directions.



RAINBOW MAGAZINE PRESENTS

COCO 3 COLOR PIE GRAPH by Bill Bernico

PIECE # 1
PIECE # 2
PIECE # 3
PIECE # 4
PIECE # 5
PIECE # 6

HIT
ANY
KEY

The Listing: CC3GRAPH

```
0 ' COPYRIGHT 1989  FALSOFT,INC
1 'COCO 3 COLOR GRAPH (C) 1988
  FROM BILL BERNICO SOFTWARE
2 WIDTH32:RGB:INPUT"HOW MANY PIE
CES (1-16)";P:IFP>16THEN2ELSEDIM
S(P,14):P=P-1:CLS:FORJ=0TOP:PRIN
T"VALUE FOR PIECE #";J+1;:INPUTT
:S(J,13)=S(J,13)+T:NEXTJ:HSCREEN
2:HCLS4:HCOLOR8,4:RGB:HPRINT(8,1
),"RAINBOW MAGAZINE PRESENTS":HL
INE(0,21)-(319,34),PSET,BF
3 HCOLOR3:HPRINT(1,3),"COCO 3 CO
LOR PIE GRAPH by Bill Bernico":H
DRAW"BM233,55C8D128R15U128L15":F
ORV=1TO16:HDRAW"NR15D8":NEXTV:FO
RTX=7TO22:HPRINT(19,TX),"PIECE #
"+STR$(TX-6):NEXTTX:GOSUB6:K=0:F
ORJ=0TOP:K=K+S(J,13):NEXTJ:FORJ=
0TOP:S(J,14)=S(J,13)/K
4 NEXTJ:X=76:Y=115:F=0:FORJ=0TOP
:S=F:F=F+S(J,14):HCIRCLE(X,Y),75
:HLINE(X,Y)-(X+74*COS(6.283*S),Y
+74*SIN(6.283*S)),PSET:HLINE(X,Y
)-(X+74*COS(6.283*F),Y+74*SIN(6.
283*F)),PSET:HPAINT(X+68*COS(6.2
83*((F+S)/2)),Y+68*SIN(6.283*((F
+S)/2))),J,8:NEXTJ
5 HCOLOR2:HPRINT(35,12),"HIT":PL
AY"O2T5B":HPRINT(35,14),"ANY":PL
AY"O3B":HPRINT(35,16),"KEY":PLAY
"O4B":EXEC44539:CMP:RUN
6 PALETTE7,52:PALETTE9,56:PALETT
E10,32:PALETTE11,20:PALETTE12,41
:PALETTE13,12:PALETTE14,60:PALET
TE15,48:Q=240:HPAINT(Q,58),0,8:H
PAINT(Q,66),1,8:HPAINT(Q,74),2,8
```

```
:HPAINT(Q,82),3,8:HPAINT(Q,98),5
,8:HPAINT(Q,106),6,8:HPAINT(Q,11
4),7,8
7 HPAINT(Q,122),8,8:HPAINT(Q,130
),9,8:HPAINT(Q,138),10,8:HPAINT(
Q,146),11,8:HPAINT(Q,154),12,8:H
PAINT(Q,162),13,8:HPAINT(Q,170),
14,8:HPAINT(Q,178),15,8
8 IFP=1THENCL=72ELSEIFP=2THENCL=
80ELSEIFP=3THENCL=88ELSEIFP=4THE
NCL=96ELSEIFP=5THENCL=104ELSEIFP
=6THENCL=112ELSEIFP=7THENCL=120E
LSEIFP=8THENCL=128ELSEIFP=9THENC
L=136ELSEIFP=10THENCL=144ELSEIFP
=11THENCL=152ELSEIFP=12THENCL=16
0ELSEIFP=13THENCL=1C6C8
9 IFP=14THENCL=176ELSEIFP=15THEN
CL=184ELSEIFP=16THENRETURN
10 HLINE(151,CL)-(250,184),PRESE
T,BF:RETURN
```

Who Ya Gonna Write?

16K
ECB

By Keiran Kenny

At my age (seven years into retirement) I have found I do not need anything very elaborate in the way of software to keep addresses for mailing labels, so I wrote this short program to provide a simple and convenient way for my limited number of addresses. *EZLabel* prints labels in two ways — one at a time or in a batch — and the menu lets you decide how you want to do it.

Addresses I use fairly often are kept in `DATA` statements as in the examples in lines 1000 to 1020. Select Option 1 (batch printing) and the addresses in the `DATA` lines are listed on the screen one at a time. If your printer is ready, you can press Y to print the address on display or N to skip it.

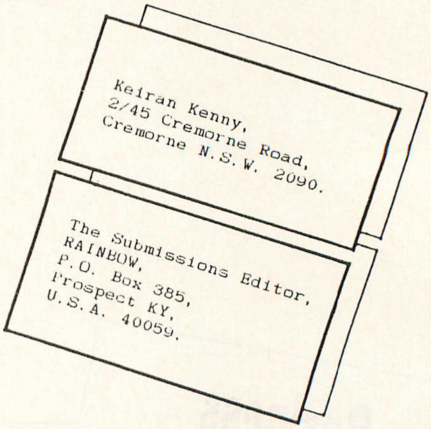
There is room for nine lines on 4-by-1½-inch labels, but you can have a maximum of seven lines per label. Line 1020 contains only one line (the program could also be used to make labels for books, etc.). I like to end each line in an address with a comma (hence the data items between quotes), but this is optional.

If you want to put your own data into lines 1000 and up, note that each address ends with a flag, `XX`, and that your last data line must read `ZZ`, as Line 2000.

If you select Option 2 from the menu in order to print out addresses that are *not* in `DATA` statements — i.e., "on the fly" — you can type and enter up to seven lines. If you have less than seven lines, enter a shifted up arrow, `CHR$(95)`, after you have entered the last line in an address. This prints a little left arrow on the screen.

Whichever option you choose, your label is printed centered horizontally and vertically on a 4-by-1½-inch label. The entry in Line 20 sets the tab position at 20, and the longest line in the address is centered under this tab position. Lines 320 to 350 establish which line is the longest line. Lines 310, 360 and 400 set blank lines at the top and bottom of each label according to the number of lines in the address to be printed. The printer control codes in Line 150 are for a DMP-130 printer.

The on-the-fly routine in lines 270 to 300 uses `LINEINPUT`, but if you do not have Extended Color `BASIC`, you can substitute `INPUT` in Line 280. You will then be unable to use commas or colons in your addresses.



The Listing: `EZLABELS`

```
0 ' COPYRIGHT 1989  FALSOFT,INC
5 'EZELABLS' by Keiran  Kenny,
  Sydney, 1988.
10 CLS:DIMN$(8)
20 TB=20 'TAB(20)
30 POKE150,18 '2400 baud.
40 PRINT@64,"DO YOU WANT TO:":PR
INT
50 PRINTTAB(2)"1. PRINT ADDRESSE
S IN DATA?":PRINT
60 PRINTTAB(2)"2. TYPE AND PRINT
 ONE-OFF",TAB(5)"ADDRESSES?":PRI
NT
70 PRINTTAB(2)"3. END PROGRAM?":
PRINT
80 PRINTTAB(8)"PRESS 1, 2 OR 3."
90 K$=INKEY$:IFK$=""THEN90
100 IFK$="1"THEN140
110 IFK$="2"THEN140
120 IFK$="3"THENCLS:END
130 GOTO90
140 PRINT:PRINT"PRINTER READY? -
 PRESS ANY KEY.":EXEC44539
150 PRINT#-2,CHR$(27);CHR$(18);C
HR$(27);CHR$(31); 'NLQ Bold
160 IFK$="2"THENCLS:PRINT@32,"TY
PE ADDRESS:":PRINT@64:GOTO270
170 N=N+1:READN$(N):IFN$(N)="ZZ"
THENCLS:RESTORE:N=0:PRINT"DATA E
ND.":GOTO40ELSEIFN$(N)="XX"THENN
=N-1:CLS:GOTO180ELSE170
180 PRINT@128
190 FORT=1TON
200 PRINTTAB(3)N$(T)
210 NEXT
220 PRINT:PRINTTAB(3)"PRINT? Y/N
"
230 C$=INKEY$:IFC$=""THEN230
240 IFC$="Y"THEN310
250 IFC$="N"THENN=0:GOTO170
260 GOTO230
270 FORN=1TO7
```

```
280 PRINT"LINE"N;CHR$(8)":";:LIN
EINPUTN$(N)
290 IFN=7THEN310ELSEIFN$(N)=CHR$
(95)THENN=N-1:GOTO310
300 NEXT
310 TM=INT((9-N)/2)
320 FORT=1TON
330 IFLEN(N$(T))>Z THEN340ELSE35
0
340 Z=LEN(N$(T))
350 NEXT
360 FORD=1TOTM:PRINT#-2:NEXT
370 FORT=1TON
380 PRINT#-2,TAB(TB-(Z/2))N$(T)
390 NEXT
400 FORD=1TO9-N-TM:PRINT#-2:NEXT
410 N=0:IFK$="1"THEN170ELSE40
420 DATA "Keiran Kenny,","2/45 C
remorne Road,",Cremorne N.S.W. 2
090.,XX
1000 DATA "The Submissions Edito
r,","RAINBOW,","P.O. Box 385,","
Prospect KY,",U.S.A. 40059.,XX
1010 DATA "The Editor,","Austral
ian CoCo Magazine,","P.O. Box 17
42,",Southport Q'ld. 4215,XX
1020 DATA MR. William P. Nutt,XX
2000 DATA ZZ
```

Graphics

An Uncommon View

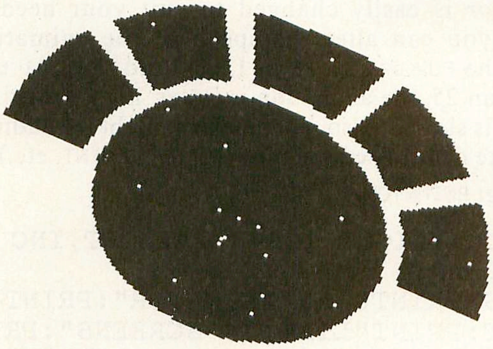
16K
ECB

By Kenneth R. Hill

Very few people have had the opportunity to view the constellation of Orion as it is depicted here — through a spaceship window. But with the 21st century about to burst onto the scene, this sort of sight might soon become common in daily life. Picture the typical next-generation CoCophile floating past his living room porthole, talking out a bug in a Hyper Extended BASIC program to the CoCo 7 on his wrist.

The Listing: STARVIEW

```
0 ' COPYRIGHT 1989  FALSOFT,INC
1 'STARVIEW
5 'Draws a view of "Orion" as se
en thru a spaceship window - wit
h sound effects. K.R.Hill.
10 PMODE 4,1:PCLEAR 4
20 PCLS
30 SCREEN 1,1
40 FOR N=1 TO 22
50 READ X,Y
60 PSET(X,Y)
70 NEXT N
80 DATA 128,96,120,96,136,96,126
,105,125,106,125,108,112,72
90 DATA 148,120,115,128,175,112,
147,128,143,105,48,80,86,68
100 DATA 164,80,88,100,68,40,92,
36,136,25,181,45,200,73,216,76
110 CIRCLE(128,96),60,,.8
120 CIRCLE(128,96),100,,.8,.5,.6
0
130 CIRCLE(128,96),65,,.8,.50,.6
0
140 LINE(28,96)-(63,96),PSET
150 LINE(45,51)-(75,67),PSET
160 CIRCLE(128,96),100,,.8,.62,.
70
170 CIRCLE(128,96),65,,.8,.62,.7
0
180 LINE(53,45)-(78,64),PSET
190 LINE(90,21)-(106,51),PSET
200 CIRCLE(128,96),100,,.8,.71,.
81
210 CIRCLE(128,96),65,,.8,.71,.8
1
220 LINE(101,20)-(113,49),PSET
230 LINE(145,49)-(158,20),PSET
240 CIRCLE(128,96),100,,.8,.82,.
90
250 CIRCLE(128,96),65,,.8,.82,.9
0
260 LINE(151,50)-(166,21),PSET
270 LINE(178,63)-(205,44),PSET
271 CIRCLE(128,96),100,,.8,.91,1
.0
272 CIRCLE(128,96),65,,.8,.91,1.
0
273 LINE(211,52)-(183,68),PSET
274 LINE(193,96)-(228,96),PSET
280 PAINT(128,0),5,5
290 SO=65312
300 POKE 65315,63
310 ST=4
320 EN=240
330 S=2
340 FOR X=ST TO EN STEP S
350 POKE SO,X
360 POKE SO,EN-X
370 NEXT X
380 GOTO 340
390 STOP
```



Animation

It'll Move You

32K
ECB

By Timothy Dueck

If the cartoonist in you is yearning to break free, do your creative conscious a favor and type in this short animation-creation program. *Animator* lets you draw up to seven screens in `PMODE 0`. When you have finished, the program cycles through the drawings, creating the effect of motion. The "control" keys for drawing (R for up, C for down, etc.) are listed upon program bootup, and the program is self-explanatory.

Animator is easily changed to suit your needs. For example, you can alter the speed of the animation by changing the `FOR J=1 to 25` in Line 75 to `FOR J=1 to` *n*. If *n* is less than 25, the animation is faster; higher than 25, the animation is slower. Also, you hackers might try adding new features like drawing commands (`CIRCLE`, `PAINT`, etc.).

The Listing: `ANIMATOR`

```
0 ' COPYRIGHT 1989  FALSOFT,INC
1 PCLEAR8
5 CLS:PRINT@12,"ANIMATOR":PRINT:
PRINT:PRINT"LIMIT 8 SCREENS":PRI
NT:PRINT"COMMANDS:":PRINT"R-UP":
PRINT"D-LEFT":PRINT"F-RIGHT":PRI
NT"C-DOWN":PRINT"5-DRAW":PRINT"6
-ERASE":PRINT"E-EXIT SCREEN":D=1
:S=1
10 PRINT"PRESS A KEY TO DRAW ON
SCREEN"S
15 A$=INKEY$:IFA$=""THEN15ELSEPM
ODE0,S:PCLS:SCREEN1,1:X=0:Y=0
20 DO$=INKEY$:IFDO$="R"ORDO$="D"
ORDO$="F"ORDO$="C"THENGOSUB30ELS
EIFDO$="5"THEND=1ELSEIFDO$="6"TH
END=0ELSEIFDO$="E"THENGOTO50
25 PRESET(X,Y):PSET(X,Y):GOTO20
30 IFDO$="R"ANDY-2<0THENRETURNEL
SEIFDO$="D"ANDX-2<0THENRETURNELS
EIFDO$="F"ANDX+2>254THENRETURNEL
SEIFDO$="C"ANDY+2>190THENRETURN
35 IFD=1THENPSET(X,Y)ELSEPRESET(
X,Y)
40 IFDO$="R"THENY=Y-2ELSEIFDO$="
D"THENX=X-2ELSEIFDO$="F"THENX=X+
2ELSEIFDO$="C"THENY=Y+2
45 RETURN
50 IFD=1THENPSET(X,Y)ELSEPRESET(
X,Y)
55 SCREEN0,0:IFS=8THEN65ELSECLS:
PRINT"ANOTHER SCREEN?(Y/N)"
60 A$=INKEY$:IFA$="Y"THENS=S+1:G
OTO10ELSEIFA$="N"THENSL=S:GOTO65
ELSE60
65 PRINT"PRESS A KEY TO SEE ANIM
ATION"
70 A$=INKEY$:IFA$=""THEN70
75 FORI=1TOSL:PMODE0,I:SCREEN1,1
:FORJ=1TO25:NEXTJ,I:GOTO75
```

Today's Forecast

CoCo 3

By Rick Cooper

Mary, Mary, quite contrary, how does your garden grow? Quite well, probably, if it drinks in as much precipitation as this CoCo 3 program ladles out. Type in *WhenRain?* and watch April's torrents coax the grass into greening. But be patient while the clouds gather — storms take a while to brew, you know.

The Listing: `WHENRAIN`

```
0 ' COPYRIGHT 1989  FALSOFT,INC
100 REM WHEN WILL IT RAIN?
110 REM BY RICK COOPER
120 REM PO BOX 276
130 REM LIBERTY, KY 42539
140 REM COPYRIGHT JULY 1988
150 ON BRK GOTO 570
160 ON ERR GOTO 570
170 HBUFF 1,2000
175 HBUFF 2,1000
177 HBUFF 3,2000
180 POKE &HFFD9,0
190 FOR X=0 TO 15:READ A:PALETTE
 X,A:NEXT X
200 DATA 0,63,17,0,0,0,0,0,0,0,0
,0,0,0,0,0
210 HCOLOR 1,0:HSCREEN2
220 L1$="F15D3C5F18D2C9F20D1C12F
5"
230 HDRAW"C1BM248,48;U2E2R2E2R3U
2R3E2R7E2R9F2R5F2R5D2R4F2R3F2D3F
2G2D2G2L3G2L4D2L5G2L5G2L9G2L7H2L
3U2L3H2L2H2U4H3E3"
240 A=244:B=36
250 HPAINT(A+20,B+15),1,1
260 L2$="WHEN WILL IT RAIN?"
262 HCOLOR 0,0
264 HPRINT(10,1),L2$
266 HGET(78,8)-(228,16),2
268 HCOLOR 1,0
270 HPRINT(10,1),L2$
275 PALETTE 2,0
280 HCOLOR 2,0
290 HPRINT(28,15),"'RAIN BY'":HP
RINT(28,17),"RICK COOPER"
293 HGET(224,120)-(312,144),3
294 HCOLOR 0,0
```

```
295 HPRINT(28,15),"'RAIN BY'":HP
RINT(28,17),"RICK COOPER"
298 PALETTE 2,17
300 J=3
310 FOR X=95 TO 145
320 HGET(A,B)-(A+68,B+32),1
330 A=A-3
340 HPUT(A,B)-(A+68,B+32),1
350 FOR Y=70 TO 189
360 R=RND(3)
370 IF R<=2 THEN HSET(X,Y,J):IF
J<15 THEN J=J+1 ELSE J=3
380 NEXT Y
390 IF X=125 THEN PALETTE 1,25
400 IF X=135 THEN PALETTE 1,7
410 NEXT X
420 FOR X=3 TO15:PALETTE X,0:NEX
TX
430 HDRAW"C3BM170,20;"+L1$
440 HPUT(78,8)-(228,16),2
450 Y=191
460 FOR Z=1 TO 60
470 FOR X=3 TO 15
480 REM IF RND(2)=1 THEN POKE &H
FFD9,0 ELSE POKE &HFFD8,0
490 IF RND(3)=1 THEN PALETTE X,6
3 ELSE PALETTE X,25
500 PALETTE X,0
510 NEXT X
520 HSET(RND(57)+90,Y,2)
530 IF Z=10 THEN HPUT(224,120)-(
312,144),3
540 NEXT Z
550 Y=Y-1
560 GOTO 460
570 RGB
580 POKE  &HFFD8,0
590 END
```

For the Birds

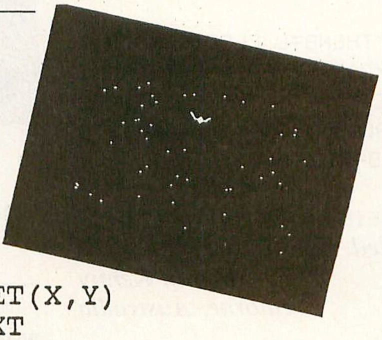
16K
ECB

By Keiran Kenny

Very young children can soon become discouraged by games in which they have to get a score, especially if big brother is kibitzing from nearby. In this program, "birdseed" is scattered at random over the screen, and a wing-flapping bird appears at the top. All the child has to do is use the right joystick to move the bird around the screen until it has "eaten" all the birdseed. Each "grain" it touches will disappear. For more birdseed and another bird, press the firebutton.

I hope you find the animation technique convincing. Line 30 draws the bird wings-down, and Line 50 draws it wings-up. The `GET` statements in lines 40 and 60 store the image in arrays (16 by 16) labelled `A` and `B`. Line 70 stores a 16-by-16 area of blank screen, labelled `C`, for use as an eraser. These are "speed" `GET-PUT`s. The images are put onto the screen and erased alternately in lines 100 to 220. The delay loop subroutine in Line 350 regulates the speed at which the bird flaps its wings.

This program was a hit with 5- and 6-year-old neighbors, but the 2-year-old just grunted and said, "Let's see the listing."



The Listing: `BIRDSEED`

```
0 'BIRDSEED' by Keiran Kenny,
   Sydney, 1988.
1 ' COPYRIGHT 1989  FALSOFT,INC
10 DIMA(6),B(6),C(6)
20 PMODE4,1:PCLS
30 DRAW"BM0,8BD4E4R2BR4R2F4":CIR
CLE(8,8),2
40 GET(0,0)-(15,15),A
50 DRAW"BM24,8BU4F4R2BR4R2E4":CI
RCLE(32,8),2
60 GET(24,0)-(39,15),B
70 GET(240,0)-(255,15),C
80 PCLS:SCREEN1,1
90 FORT=1TO50
100 X=40+RND(176)
110 Y=40+RND(111)
120 IFPPOINT(X,Y)<>0THEN100
130 PSET(X,Y)
140 NEXT
150 X=120:Y=8
160 PUT(X,Y)-(X+15,Y+15),A
170 GOSUB350
180 PUT(X,Y)-(X+15,Y+15),C
190 GOSUB350
200 PUT(X,Y)-(X+15,Y+15),B
210 GOSUB350
220 PUT(X,Y)-(X+15,Y+15),C
230 GOSUB350
240 J0=JOYSTK(0):J1=JOYSTK(1)
250 IFJ0<63THENX=X-8
260 IFJ0>0THENX=X+8
270 IFJ1<31THENY=Y-8
280 IFJ1>0THENY=Y+8
290 IFX<8THENX=8
300 IFX>232THENX=232
310 IFY<8THENY=8
320 IFY>176THENY=176
330 IFPEEK(65280)=126ORPEEK(6528
0)=254THENPCLS:GOTO90
340 GOTO160
350 FORD=1TO50:NEXT:RETURN
```

Submissions to "Novices Niche" are welcome from everyone. We like to run a variety of short programs that can be typed in at one sitting and are useful, educational and fun. Keep in mind, although the short programs are limited in scope, many novice programmers find it enjoyable and quite educational to improve the software written by others.

Program submissions must be on tape or disk. We're sorry, but we cannot key in program listings. All programs should be supported by some editorial commentary, explaining how the program works. If your submission is accepted for publication, the payment rate will be established and agreed upon prior to publication.

BASICally
Q&A
Speaking

By Bill Bernico
Rainbow Contributing Editor
with Larry Boeldt

Puzzled Programming

Dear Bill,

Below are lines from two fine programs from RAINBOW *that have always puzzled me. I hope you can help me.*

From Calendar *by Roger Bouchard, January 1987, Page 47:*

```
140 IFY>1582THENIFY=INT(Y/4)*4TH
ENM(1)=29:IFY=INT(Y/100)*100ANDY
<>INT(Y/400)*400THENM(1)=28ELSEE
LSEELSEGOSUB650:GOTO120
```

From Poker *by Robert Brimmer, March 1987, Page 100:*

```
26 IFB$="A"THENB=D ELSEIFB$="H"T
HENB=INT(D/2)ELSEIFB$="Q"THENB=I
NT(D/4)ELSEIFB$="T"THENB=INT(D*3
/4)ELSEB=VAL(B$):IFB$<"0"ORB$>"9
"THENELSEIFB=0THENB=10
```

The `THENELSEIF` *at the end of Line 26 has me puzzled.*

Keiran Kenny
Cremorne, Austrailia

BASIC does not use the most elegant nesting of logic statements, sometimes known as *logic constructs*. Let's pretend that BASIC is a bit more free-flowing. Take a look at how the statement shown in Figure 1 might be taken apart and notice how it works.

Now look at this statement and notice that at each level of logic, I indented the lines. This makes it easier to read. Remember that `ELSE` gives an alternate option if the logic test (for example, `IF y>1582`) is false. So the `ELSE` statements simply move the BASIC interpreter out of the nest of `IF/THEN` statements.

As for the second problem, a more logical way to write the statement:

```
IF B$<"0" OR B$>"9" THENELSEIFB=
0 THEN B=10
```

would be to reverse the logic during the test:

```
IF NOT(B<"0" OR B$>"9") THEN IF
B=0 THEN B=10
```

Notice how much more readable this is. BASIC is a wonderful language, but it unfortunately adapts itself to some less readable programming techniques. None the less, BASIC remains one of my all time favorites. Keep those questions coming!

Correction Please

Dear Bill:

I'm having a bit of trouble with your program on page 144 of the December '88 issue. The moving cursor motion is either down or to the right, but I can't move it one way then the other. When I try to move up or left, the cursor simply erases itself.

I double-checked the program, but I don't have the know-how to make the needed adjustments. I'm wondering if anyone else has this problem.

Walter R. Coggan
Seattle

The only error I could find in the "BASICally Speaking" column of December 1988 was under the title *Repeat After Me*. The first example was incorrectly ordered. You should get the proper results, if you type it as follows:

```
10 CLS
20 FORX=338TO345:POKEX,255:NEXTX
30 A$=INKEY$:IF A$="" THEN 20
40 PRINT A$;
50 GOTO 20
```

The locations must be poked before running the `INKEY$` command.

Questions about specific BASIC programming problems can be addressed to BASICally Speaking, THE RAINBOW, P.O. Box 385, Prospect KY 40059.

We reserve the right to publish only questions of general interest and to edit for brevity and clarity. We are unable to answer letters individually.

For a quicker response, your questions may also be submitted through RAINBOW's CoCo SIG on Delphi. From the CoCo SIG>prompt, type `ASK` for "Ask the Experts." At the EXPERTS>prompt, select the "BASICally Speaking" online form, which has complete instructions.

```
      140
           IF Y>1582 THEN
               IF Y=INT(Y/4)*4 THEN
                 M(1)=29
                 IF Y=INT(Y/100)*100 AND Y<>INT(Y/400)*400 THEN
                     M(1)=28
                 ELSE
               ELSE
           ELSE
           GOSUB 650
           GOTO 120
      150
```

Figure 1

Bill Bernico is the author of over 200 Color Computer programs and is a frequent RAINBOW *contributor whose hobbies include golf, writing music and programming. Bill is a drummer in a rock band and lives in Sheboygan, Wisconsin.*

Larry Boeldt has programmed on the Color Computer for five years. He has experience in BASIC, *Pascal and* FORTRAN *IV. He runs a software customizing business for the CoCo market.*

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RAINBOW

Give us your best: Join the ranks of these courageous CoCoists in showing the Color Computer world your high score at your favorite micro-diversion. We want to put your best effort on record in THE RAINBOW's bimonthly "Scoreboard" column. All entries must be received 60 days prior to publication. Entries should be printed — legibly — and must include your *full* name, address, game title, company name and, of course, your high score. Each individual is limited to three score entries per month. Send your entries to Scoreboard, c/o THE RAINBOW.

For greater convenience, your high scores may also be sent to us through the MAIL section of our Delphi CoCo SIG. From the CoCo SIG> prompt, pick MAIL, then type `SEND` and address to: `EDITORS`.

★ Current Record Holder ● Shutout

ADVANCED STAR*TRENCH (THE RAINBOW, 7/86)
4,750 ★Stephane Martel, Laval, Quebec
4,500 Frankie DiGiovanni, Olney, MD
4,475 David Schaller, Clarkston, WA

ANDRONE *(Radio Shack)*
20,820 ★Gary Budzak, Westerville, OH

ASTRO BLAST *(Mark Data)*
49,356 ★Brian S. Brame, Lakeside, CA
48,825 Tony Bacon, Mt. Vernon, IN
24,980 Matthew Smith, Courtenay, British Columbia

ATOM *(Radio Shack)*
Round 2 James Donegan, Saurgerties, NY

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1,627,500 Matthew Fumich, Munford, TN
1,002,700 Chris Kremo, Bethel, CT
437,200 Jack Rowe, Fenton, MO
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34,720 Chris Kremo, Bethel, CT
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387-0 ●Joel Stocksdale, Racine, WI
276-0 ●Kevin Wannemacher, Payne, OH
238-0 ●John Valentine, Marlborough, CT
172-0 ●Ryan Murray, Herrin, IL
149-0 ●John Breckel, Wilmington, OH
137-0 ●Scott Galvao, Tiverton, RI
137-0 ●Jennifer Johnson, Meriden, CT
132-0 ●Karen Rimiller, Adams, NY
130-0 ●Matthew Snider, Pinehurst, TX
130-2 Greg Allen, Atwater, CA
126-0 ●Jason Trammel, Murphysboro, IL
113-0 ●Chris Donato, Euclid, OH

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343,075 ★Duncan Cameron, Chippewa Falls, WI
316,550 Alan Martin, Cornwall, Ontario

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70,557,600 ★Earl Foster, Lynchburg, VA

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308 Erin Carlton, Charleston, SC

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45,235,820 Ken Hubbard, Madison, WI
23,643,720 Geran Stalker, Rivordalo, GA

GANTELET II *(Diecom Products)*
65,399,289 ★Corey Kepler, Renovo, PA

GANTELET II (continued)
17,701,060 Bryan Bell, Manassas, VA
55,015 Andy Freeman, Turtle Lake, WI

GFL CHAMPIONSHIP FOOTBALL II *(Tandy)*
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825-0 Ryan Grady, Newbury Park, GA
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103 Phil Holsten, Moraga, CA

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400/359 ★Roy Grant, Toledo, OH
400/422 Jeff Holtham, Waterloo, Ontario
400/510 Brad Wilson, Lithia Springs, GA

IRON FOREST *(Diecom Products)*
5,671,500 ★Douglas Paulson, Richfield, ID
4,088,000 Gabriel Riley, Richfield, ID
3,173,200 Charles Boyd, Amarillo, TX
2,676,300 Janet Boyd, Amarillo, TX
1,376,850 Ricky Turkett, Marlow, OK

JOKER POKER (THE RAINBOW, 3/87)
62,067,906 ★Carole Rueckert, Mansfield, OH
21,733,284 Jon Fogarty, Yale, MI
8,179,710 Brenda Kim, Athens, OH

JUNIOR'S REVENGE *(Computerware)*
2,503,000 ★Stephane Martel, Laval, Quebec
257,600 Keith Cohen, Rocky Mount, NC

JUNKFOOD (THE RAINBOW, 11/84)
535,760 ★Charlie Ginn, Augusta, GA
356,850 Jon Hobson, Plainfield, WI
18,990 Joel Klein, Indianapolis, IN

KING PEDE *(T & D Software)*
83,855 ★Mike Snyder, Allen, OK

KNOCK OUT *(Diecom Products)*
472,995 ★Frank D'Amato, Brooklyn, NY
183,675 Rush Caley, Port Orchard, WA

KORONIS RIFT *(Epyx)*
188,250 ★Mario Zuvieta, McAllen, TX
186,710 Tony Harbin, Cullman, AL

KUNG-FU DUDE *(Sundog Systems)*
32,000 ★Tony Geitgey, University Park, PA
14,305 David Schulze, San Antonio, TX
12,150 Cody Deegan, Fallon, NV

THE LAIR *(Freebooter Software)*
112,940 ★James Walton, Pittsburgh, PA

LANDER *(T&D Software)*
780 ★Ari Enkin, Neapen, Ontario

LASER SURGEON: THE MICROSCOPIC MISSION *(Activision)*
42,767 ★Joe Stanley, Harrisburg, IL

LUNAR-ROVER PATROL *(Spectral Associates)*
45,700 ★Kameron Pence, Little Rock, AR
37,900 Michael Little, Acme Alta, Canada
37,890 Dave Staub, Moundsville, WV

SCOREBOARD

MARBLE MAZE *(Diecom Products)*
353,220 ★David Boland, Dubuque, IA
30,650 Amber Reynolds, White City, Saskatchewan
A MAZING WORLD OF MALCOLM MORTAR *(Radio Shack)*
7,035 ★Thomas S. Corbitt III, Yaupon Beach, NC
6,125 Stephen McJohnathan, Keymar, MD
5,030 Jeanne Henning, Quincy, IL
MEGA-BUG *(Radio Shack)*
12,000 ★Matthew Smith, Courtenay, British Columbia, Canada
10,044 Douglas Bacon, Middletown, CT
9,309 Alan Kramer, Cooksville, MD
MEMOCARDS (THE RAINBOW, 8/87)
3,120 ★Lise Gagne, St-David, Quebec
1,964 Scott Walotkiewicz, Tworivers, WI
1,640 Sara Mittelstaedt, Kiel, WI
MISSION: F-16 ASSAULT *(Diecom Products)*
565,395 ★Tony Bacon, Mt. Vernon, IN
468,750 Karen Jessen, Cleveland, OH
355,570 Stirling Dell, Dundalk, Ontario
MISSION: RUSH'N ASSAULT *(Diecom Products)*
787,300 ★Tony Bacon, Mt. Vernon, IN
361,750 Clay Jones, Wooster, OH
212,500 Kelly Jones, West Salem, OH
195,250 Kelly Jones, West Salem, OH
86,350 Alan Lindabery, Thorndale, PA
MONSTER MAZE *(Radio Shack)*
52,510 ★Chris Kremo, Bethel, CT
12,950 Paul DeVita, Vallejo, CA
ONE-ON-ONE *(Radio Shack)*
1,310-0 ★●Jon Breckel, Wilmington, OH
1,302-0 ●Thomas Payton, Anderson, SC
1,276-0 ●Jonathan Dorris, Indianapolis, IN
1,260-0 ●Brandon Reece, Chickamauga, GA
1,248-0 ●Kevin Hilton, Conway, AZ
OUTHOUSE *(MichTron)*
534,060 ★Kay Foxe, Kansas City, MO
59,641 Sam Zehel, Coal Center, PA
38,640 Dave Staub, Moundsville, WV
PAPER ROUTE *(Diecom Products)*
248,400 ★Cathy E. Kimble, Glendale, AZ
150,560 Heather Hamblen, Bar Harbor, ME
PITFALL II *(Activision)*
1,568,500 ★Sandy Baker, Martin City, Montana
1,519,500 Jim Hammons, Martin City, Montana
1,085,500 Tracey Lee Slack, Atwood, Ontario
871,500 Aaron Florence, English, IN
586,500 Jonathan Toloski, Torrington, CT
POOYAN *(Datasoft)*
626,700 ★Charles Rene de Cotret, Saint-Laurent, Quebec
566,850 Lois Crowson, East Alton, IL
POPCORN *(Radio Shack)*
150,560 ★Tom Cherubino, Brooklyn, NY
105,560 Heather Condit, Grafton, ND
26,889 Claude Jalbert, Matane, Quebec
25,450 Dianne Mozzetti, Pittsburgh, PA
PROSPECTOR *(THE RAINBOW, 12/88)*
16,100 ★Sara Mittelstaedt, Kiel, WI
15,150 Cray Augsburg
4,100 Angie Mittelstaedt, Kiel, WI
4,050 Jutta Kapfhammer
3,550 Lauren Willoughby
PYRAMID 2000 *(Radio Shack)*
220 ★Darren King, Yorkton, Saskatchewan
220 ★Mike Snyder, Allen, OK
PYRAMIX *(Color Venture)*
68,550 ★Andy Freeman, Turtle Lake, WI
67,850 Richard Winkelbauer, Bronx, NY
QUIX *(Tom Mix)*
8,407,772 ★John Haldane, Tempe, AZ
RAD WARRIOR *(Epyx)*
3,936 ★Matthew Smith, Courtenay, British Columbia
RADIO BALL *(Radio Shack)*
1,780,870 ★Jocelyn Gagne, St-David, Quebec
1,761,030 Eric Mellon, Newark, DE
1,666,670 Lise Gagne, St-David, Qeubec
REACTOID *(Radio Shack)*
8,055 ★Gary Budzak, Westerville, OH
RED WARRIOR *(Radio Shack)*
5,488 ★Scott Godfrey, Nashua, NH
4,164 Roger Rance, Charleston, SC
4,011 Erin Carlton, Charleston, SC
RESCUE ON FRACTALUS *(Epyx)*
1,000,948 ★Steven Ujvary, Calgary, Alberta
323,167 Kenneth Hill, Severna Park, MD
RETURN OF JUNIOR'S REVENGE *(Colorware)*
1,792,800 ★Chad Presley, Luseland, Saskatchewan
ROGUE *(Epyx)*
71,833 ★Jon Fogarty, Yale, MI
65,529 Joseph H. Campbell, Norfolk, VA
SAILOR MAN *(Tom Mix)*
427,700 ★Marnie Schalm, Edson, Alberta
231,900 Jessica Wilkins, Seymour, TN
231,700 Luis Camino, Lima, Peru
SANDS OF EGYPT *(Radio Shack)*
67 ★Tristan Terkuc, Richmond, Ontario
82 Edward Rocha, Cobleskill, NY
SAUCER DEFENSE *(THE RAINBOW, 4/87)*
95,000 ★Kevin Hilton, Conway, AZ
40,000 David Hartmann, Osoyoos, British Columbia
SHAMUS *(Radio Shack)*
50,840 ★Chris Kremo, Bethel, CT
30,515 Scott Galvao, Tiverton, RI
SHOOTING GALLERY *(Radio Shack)*
36,830 ★Patricia Strakey, Littleton, CO
27,270 Jocelyn Hellyer, Montgomery, IL
25,510 Donald Knudson, Minot, ND
SHOOT'N RANGE (THE RAINBOW, 8/87)
55,623 ★Paul Robbins, Picayune, MS
14,702 Richard Winkelbauer, Bronx, NY
13,794 Phillip Holsten, Modesto, CA
SILPHEED *(Game Arts)*
80,603 ★Frankie DiGiovanni, Olney, MD
SLAY THE NERIUS *(Radio Shack)*
73,091 ★Jeff Remick, Warren, MI
65,921 Chris Lucero, Denver, CO
63,476 Chris Kremo, Bethel, CT
21,410 Scott Severtson, Jamestown, NY
SNEAKY SNAKE (THE RAINBOW, 8/87)
102 ★Mike Alt, San Juan Capistrano, CA
63 Matthew Smith, Courtenay, British Columbia
SPACE ASSAULT *(Radio Shack)*
13,110 ★Jeff Remick, Warren, MI
7,280 Jason Kopp, Downs, IL
6,200 John Weaver, Amsterdam, NY
SPACE INVADERS *(Spectral Associates)*
3,920 ★Ari Enkin, Neapen, Ontario
SPEED RACER *(MichTron)*
103,120 ★Ricky Turkett, Marlow, OK
97,400 Jeff Morrison, Marlow, OK
96,420 Karen Rimiller, Adams, NY
96,000 Amber Reynolds, White City, Saskatchewan
SPEEDSTER (THE RAINBOW 8/87)
250,500 ★Kevin Hilton, Conway, AZ
SPEEDSTER (continued)
211,300 Paul Robbins, Picayune, MS
117,080 Bill Millington, Meriden, CT
SPIDERCIDE *(Radio Shack)*
27,730 ★Mike LeBrun, Cornwall, Ontario
SPRINGSTER *(Radio Shack)*
303,520 ★Mavis Hartmann, Osoyoos, British Columbia
200,670 Denise Root, Thorndale, PA
41,230 Jason Trammel, Murphysboro, IL
STAR BLAZE *(Radio Shack)*
8,950 ★Richard Durksen, Grunthal, Manitoba
6,550 Flint Weller, Swarthmore, PA
STRATA (THE RAINBOW, 5/88)
2,992 ★Alan Lindaberry, Thorndale, PA
2,888 Paul Robbins, Picayune, MS
2,768 H. Dingwell, Litchfield, CT
SUPER PITFALL *(Radio Shack)*
1,293,500 ★Jimmy Campanella, DuQuoin, IL
TEMPLE OF ROM *(Radio Shack)*
604,000 ★Troy Graham, Arnold, MD
507,700 Adam Broughton, Morris, PA
303,600 Tim Hennon, Highland, IN
THEXDER *(Sierra On-Line)*
2,033,000 ★Frankie DiGiovanni, Olney, MD
1,823,900 Tom Gauwitz, Roanoke, IL
1,411,700 Steve Hallin, Biloxi, MS
TIME BANDIT *(MichTron)*
76,030 ★Brent Morgan, Centerville, OH
59,020 Stephanie Morgan, Centerville, OH
TREKBOER *(Mark Data)*
123 ★Roy Grant, Toledo, OH
132 Matthew Fumich, Munford, TN
TRIG ATTACK *(Sugar Software)*
196,000 ★Cassaundra Stewart, Sacramento, CA
TUT'S TOMB (THE RAINBOW, 7/88)
54,344 ★Brian Brame, Lakeside, CA
53,280 William Currie, Bryans Road, MD
VARLOC *(Radio Shack)*
2,502 ★Frank D'Amato, Brooklyn, NY
2,032 Tony Harbin, Cullman, AL
2,032 Edward Rocha, Cobleskill, NY
VICIOUS VIC (THE RAINBOW, 7/86)
18,813 ★Talib Khan, Bronx, NY
15,063 John Conley, Everett, WA
WILDWEST *(Tom Mix)*
35 ★Paul Summers, Orange Park, FL
WISHBRINGER *(Infocom)*
400/201 ★Brad Wilson, Lithia Springs, GA
WIZARD'S DEN *(Tom Mix)*
593,950 ★Richard Winkelbauer, Bronx, NY
425,350 Leif Smedberg, Columbia City, IN
195,050 Mark Touchette, Preston, CT
WRESTLE MANIAC *(Diecom)*
956,971 ★Marc Reiter, Cincinnati, OH
546,315 Louis Bouchard, Gatineau, Quebec
ZAKSUND *(Elite Software)*
557,900 ★Tom Cherubino, Brooklyn, NY
357,550 Martin Parada, Arcadia, CA
268,350 Tony Bacon, Mt. Vernon, IN
ZAXXON *(Datasoft)*
2,061,000 ★Byron Alford, Raytown, MO
1,950,000 Blake Cadmus, Reading, PA
ZONERUNNER *(Radio Shack)*
65,535 ★Scott Godfrey, Nashua, NH
65,535 ★Mike Woycheshen, Coquitlam, British Columbia
ZORK I(Infocom)
350/328 ★Konnie Grant, Toledo, OH
350/587 Matthew Yarrows, Easthampton, MA

SCOREBOARD POINTERS

In conjunction with THE RAINBOW's Scoreboard, we offer this bi-monthly column of pointers for our game-playing readers' benefit. If you have some interesting hints, tips or responses to questions, or want help yourself, we encourage you to write to the Scoreboard, c/o THE RAINBOW.

In response to questions from:

•Danielle Ramsey: In *Dallas Quest*, once you are in the cave you must hatch the eggs over the torch. Be sure to have the flashlight in your possession or you will get stuck.

In *White Fire of Eternity*, how do you get the pick from the statue's hands? What is the ring used for?

Michael Duvall
Zanesville, Ohio

•Floyd Kiernan: In a Greek myth, Atlanta's competitor rolled golden apples in front of Atlanta to distract her. Perhaps this is your solution in *Mythology.*

In *Koronis Rift*, how do I find the home base of the saucer guardians in Rift 20?

In *Dungeons of Daggorath*, what is the correct incantation for the Supreme ring?

In *The Gantelet II*, how do you pass the nineteenth level? When I get there, I am in a room without doors, destructible or movable walls, teleporters, or passages out. However, I *can* see monsters in other rooms. How do I leave the beginning room?

Frankie DiGiovanni
Olney, Maryland

•Duane Whitlock: In *Madness and the Minotaur*, to kill the Hydra you must have either the dagger or the sword. Then, type `STAB HYDRA` and you can retrieve the rope. You will probably find the fourth spell on the second level (below the level with the pool).

James Stakelin
Cynthiana, Kentucky

•Floyd Resler: In *In Search of the Star Lord*, you will find the circuit board (microchip) in the laser panel. Don't forget the wedge.

•Andrea Jenkins: To get out of the tree in *Dallas Quest*, open the pouch (obtained from the desk) and give it to the monkey, then drop the parachute.

•H. James Herchek: In *Wishbringer*, to get past the troll, give it the can, but be sure to get it back again. In *Dallas Quest*, in order to leave the trading post, you must feed the monkey. He will open the secret door, but you will need a flashlight.

•Angela Aldred: To get past the rats in *Sam Diamond P.I.*, feed them. But to do that you will need money to buy food in the diner.

Dianne Piper
Beloit, Wisconsin

•Chris Franson: In *Pyramid*, to get the statue of the bird god, you must first have the box. Then drop the scepter and get the statue. Later in the Pharoah's chamber, to get past the serpent, type `THROW STATUE`. It will attack the serpent and drive it away. Then drop the scepter and get the statue.

Robert Reed
Albequerque, New Mexico

•John Knight: In *Hitchhiker's Guide to the Galaxy*, to open the screening door, get the real tea (not the substitute), then go to the screening door and open it. Drink the tea before you go inside, or else you will die of immense depression. To open the hatch you will need to eat the fruit to discover which tool you'll need. Then, go to the hatch room and enter the access space with only the tool in your possession. Enter the space and wait for Marvin and give him the tool when he asks for it.

In *One-on-One*, some interesting facts: If you press S you will get a shadow of the ball which will help you rebound. Are you going to make a fantastic shot? Press 2 for slow motion, press 1 to resume normal play. Does anyone know how to do a behind-the-backboard shot or a three-pointer?

In *Wizard's Castle*, where is the princess and how do I free her? The hints are absolutely no help at all.

Eric Reitz
Mendham, New Jersey

•Chris Franson: In *Pyramid*, to get the statue of the bird god, you must first have the box. Then drop the scepter and get the statue. Later in the Pharoah's chamber, to get past the serpent, type `THROW STATUE`. It will attack the serpent and drive it away. Then drop the scepter and get the statue.

Robert Reed
Albequerque, New Mexico

In *The Interbank Incident*, where is the cartridge and the special IBC card?

David Ring
Lyman, Nebraska

In *Hall of the King*, I've moved the rubble and covered the rock, but I can't cross the river.

David Schulze
San Antonio, Texas

In *Shenanigans*, where is the trap door in the cave?

Eddy Salas
San Antonio, Texas

In *Sands of Egypt*, how do you get in the boat drain?

In *Dallas Quest*, how do you bribe the parrot into helping you?

Darrel Hoffman
The Colny, Texas

How do you get across the rug in *Raaka-Tu*?

In *Madness and the Minotaur*, I cannot figure out how to get the shield or how to jump it.

Peter Menning
Albuquerque, New Mexico

In *The Castle of Narios*, at the sign it requests that you say the password. What is the password?

In *The Hero of Lonesome Valley*, what is the combination vials for the crystal?

R. Phar
Baton Rouge, Louisiana

To respond to other readers' inquiries and requests for assistance, reply to "Scoreboard Pointers," c/o THE RAINBOW, P.O. Box 385, Prospect, KY 40059. We will share your reply with all "Scoreboard" readers in an upcoming issue.

For greater convenience, "Scoreboard Pointers" and requests for assistance may also be sent to us through the MAIL section of our Delphi CoCo SIG. From the CoCo SIG> prompt, pick MAIL, then type `SEND` and address to: `EDITORS`. Be sure to include your complete name and address.

Measure your life in bits and bytes

How Much Time?

By Fred B. Scerbo
Rainbow Contributing Editor

If you have an idea for the "Wishing Well," submit it to Fred c/o THE RAINBOW. Remember, keep your ideas specific, and don't forget this is BASIC. All programs resulting from your wishes are for your use, but remain the property of the author.

Last month we examined a program that turned your Color Computer into an easy-to-use calculator. This month, we will take that idea one step further by introducing *Time Card*, a program to do a task that few, if any, calculators are designed to do — add time.

This program is intended as a small-business utility and is not an educational program. It can be adapted for any of the Tandy 1000 line of computers. (More on that later.)

Pressing Need

Have you ever tried adding time or figuring out the difference between two times, such as a starting and finishing time? If you have, you have noticed it's different from regular addition and subtraction, where we are working with a Base 10 number system. Every tenth digit clicks over a digit in the next column. However, time is based on a Base 60 system. The digit in the minute column does not click until you have passed sixty in the seconds column. The same holds true for hours and minutes.

If we were to add time on a Base 10 system, the following problem would work out this way:

```
  2:45
+ 3:45
------
  5:90
```

However, on a Base 60 number system, the 90 would equal one and a half hours. Therefore, a one would be carried to the hour column and 30 minutes would remain. This is shown in the following example:

```
  2:45
+ 3:45
------
  6:30
```

The same holds true when you subtract time. When you borrow from the hour's column, you borrow 60 minutes, not 10. Thus the following would be true:

```
  4:15  =   3:75
- 1:57    - 1:57
          ------
            2:18
```

Practical Uses

If you have ever tried to calculate the hours an employee has worked based on his or her time card, you know how frustrating it can be. When do you round off a period of time? Does eight minutes equal a full quarter of an hour? Is seven minutes too little?

Time Card solves this problem by letting you figure out the differences between two punched times and totaling the accumulated hours. If you want to have an eight-minute period rounded to a quarter of an hour, it also does that.

I won't go into the details of how the program works. Let it suffice that the subroutines involved translate the time into Base 60 math. It does all the necessary borrowing or carrying without losing its accuracy. Since it also keeps a running total of the hours worked, it will be a real bonus to any

---

Fred Scerbo is a special needs instructor for the North Adams Public Schools in North Adams, Massachusetts. He holds a master's in education and has published some of the first software available for the Color Computer through his software firm, Illustrated Memory Banks.

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small company or "Mom and Pop" business.

Using the Program

When you run the program, the title screen appears. You can advance the program by answering the following question: "Round Off (Y/N)?" A round-off will make any eight-minute period equal a full fifteen minutes of work.

The work screen then appears. Enter the starting time by pressing the digits required. For example, the time 3:45 is entered by typing `345`. This time appears on the screen as 3:45. You then press ENTER to move to the ending time. If the time entered is four digits, such as 12:45, do not press ENTER. You also do not need to worry about a.m. or p.m. times.

Once the ending time has been entered, the calculation appears as "Time Elapsed" and "Total Work Time." If you want to clear the total and start again, press CLEAR, and the totals revert to zero. Pressing the space bar adds the next time to the total time. This way, you can do a whole week's worth of calculations for one worker.

Conclusion

That's all there is to it. If you want to alter this program for the Tandy 1000, be my guest. You'll need to reformat for the screen size, but otherwise everything else should work. Let me know what luck you have with it.

Thanks again to those who even now are sending old CoCos to our special-needs department. They are put to good use helping our resource students throughout the city. Keep sending in your ideas and suggestions. Next month, we'll try something new. ☐

50	88	325	142
140	33	END	219
265	115		

The Listing `TIMECARD`

```
1 REM****************************
2 REM*   TIMECARD CALCULATOR    *
3 REM*   COPYRIGHT (C) 1988     *
4 REM*    BY FRED B. SCERBO     *
5 REM*    60 HARDING AVENUE     *
6 REM*  NORTH ADAMS, MA 01247   *
7 REM****************************
8 CLEAR1000
9 CLS0
10 PRINTSTRING$(32,188)STRING$(3
2,204);
15 FORI=1TO 160 :READ A:PRINTCHR
$(A+128);:NEXT
20 PRINTSTRING$(32,195)STRING$(3
2,179);
25 PRINT@358," TIMECARD CALCULAT
OR ";
30 PRINT@390,"  BY FRED B. SCERB
O ";
35 PRINT@422," COPYRIGHT (C) 198
8 ";
40 DATA94,92,94,92,90,93,88,93,9
2,93,92,93,88,93,92,92,90,21,28,
28,26,30,28,29,20,30,28,29,20,30
,28,29
45 DATA88,80,90,,88,85,,85,,85,,
85,,85,,80,82,21,,,,26,,21,,26,,
21,,26,,21
50 DATA,,90,,,85,,85,,85,,85,,85
,92,92,90,21,,,,30,28,29,,30,29,
28,,26,,21
55 DATA,,90,,,85,,85,,85,,85,,85
,,,80,21,,,,26,,21,,26,21,18,,26
,,21
60 DATA,81,91,,,87,82,87,82,,,87
,82,87,83,83,90,21,19,19,26,27,1
6,23,17,27,,27,17,27,19,23
65 IFINKEY$<>CHR$(13)THEN65
70 CLS
75 PRINT@232,"ROUND-OFF (Y/N) ?"
;
80 X$=INKEY$:IFX$=""THEN80
85 IFX$="Y"THENR=1:GOTO100
90 IFX$="N"THENR=0:GOTO100
95 GOTO80
100 A$(4)="00:00"
105 A$(1)="00:00":A$(2)="00:00":
A$(3)="00:00"
110 GOSUB115:GOTO185
115 PRINT@0,"";:PRINT:PRINT
120 PRINTTAB(5)"TIME CLOCK CALCU
LATOR"
125 PRINT
130 PRINTTAB(5)"STARTING TIME:
 "A$(1)
135 PRINT
140 PRINTTAB(5)"ENDING TIME:
 "A$(2)
145 PRINT
150 PRINTTAB(5)"TIME ELAPSED:
 "A$(3)
155 PRINT
160 PRINTTAB(5)"TOTAL WORK TIME:
 "A$(4)
165 PRINT
170 PRINTTAB(5)"PRESS SPACEBAR F
OR MORE"
175 PRINTTAB(5)"PRESS CLEAR FOR
RESTART"
180 RETURN
185 REM START CALCULATIONS
190 FORQ=1TO2
195 FORI=1TO4
200 X$=INKEY$:IFX$=""THEN200
205 IFX$=CHR$(13) AND I=4THEN260
210 IFX$=" "THEN105
215 IFX$=CHR$(12)THEN70
220 X=ASC(X$)-48:IFX<0THEN200
225 IFX>9THEN200
230 Z$=Z$+X$
235 IFI=1THENA$(Q)="00:0"+Z$
240 IFI=2THENA$(Q)="00:"+Z$
```

```
245 IFI=3THENA$(Q)="0"+LEFT$(Z$,
1)+":"+RIGHT$(Z$,2)
250 IFI=4THENA$(Q)=LEFT$(Z$,2)+"
:"+RIGHT$(Z$,2)
255 GOSUB115:NEXTI
260 Z$=""
265 CH=VAL(MID$(A$(Q),4,1)):IF C
H=>6THEN Z$="":A$(Q)="00:00":GOS
UB115:GOTO195
270 NEXTQ
275 A(2,2)=VAL(LEFT$(A$(2),2)):A
(2,1)=VAL(RIGHT$(A$(2),2))
280 A(1,2)=VAL(LEFT$(A$(1),2)):A
(1,1)=VAL(RIGHT$(A$(1),2))
285 IFA(2,1)<A(1,1)THEN A(2,1)=A
(2,1)+60:A(2,2)=A(2,2)-1
290 A(3,1)=A(2,1)-A(1,1)
295 IF R=0THEN320
300 IF A(3,1)=>8 AND A(3,1)<15
THEN A(3,1)=15
305 IF A(3,1)=>23 AND A(3,1)<30
THEN A(3,1)=30
310 IF A(3,1)=>38 AND A(3,1)<45
THEN A(3,1)=45
315 IF A(3,1)=>53 AND A(3,1)<60
THEN A(3,1)=0:A(2,2)=A(2,2)+1
320 IFA(2,2)<A(1,2)THEN A(2,2)=A
(2,2)+12
325 A(3,2)=A(2,2)-A(1,2)
330 C$=STR$(A(3,2)):IF LEN(C$)=2
 THEN C$="0"+RIGHT$(C$,1) ELSE C
$=RIGHT$(C$,2)
335 D$=STR$(A(3,1)):IF LEN(D$)=2
 THEN D$="0"+RIGHT$(D$,1) ELSE D
$=RIGHT$(D$,2)
340 A$(3)=C$+":"+D$
345 GOSUB115
350 C(1)=VAL(C$):D(1)=VAL(D$)
355 C(2)=VAL(LEFT$(A$(4),2)):D(2
)=VAL(RIGHT$(A$(4),2))
360 D(3)=D(1)+D(2):IF D(3)=>60 T
HEN D(3)=D(3)-60:C(1)=C(1)+1
365 C(3)=C(1)+C(2)
370 C$=STR$(C(3)):IFLEN(C$)=2 TH
EN C$="0"+RIGHT$(C$,1) ELSE C$=R
IGHT$(C$,2)
375 D$=STR$(D(3)):IFLEN(D$)=2 TH
EN D$="0"+RIGHT$(D$,1) ELSE D$=R
IGHT$(D$,2)
380 A$(4)=C$+":"+D$
385 GOSUB115
390 X$=INKEY$:IFX$=""THEN390
395 IFX$=" "THEN105
400 IFX$=CHR$(12)THEN70
405 GOTO390
410 GOTO410
```

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DOCTOR Q&A ASCII

By Richard E. Esposito
Rainbow Contributing Editor
with Richard W. Libra

Speedier Operations

I would like to know if the CoCo 3 always operates at the faster clock speed of 2 MHz during BASIC *programs, machine language programs or just a normal listing of a directory on a screen. Is there a command that is used in* BASIC *and ML programs that makes the CoCo operate at the faster speed? I have the older disk controller catalog* (Cat.#26-3029). *Will this controller allow the computer to operate at the faster speed for disk input/output? I also have the Multi-Pak interface that is not upgraded with the new PAL chip. By the way, everything seems to work fine without the PAL chip upgrade.*

Edward G. Stroh
Thornton, Illinois

℞ The CoCo 3 on boot-up to Disk Color BASIC runs at 1 MHz. To switch it into 2-MHz operation, type `POKE 65497,0`. OS-9 Level II has this poke embedded in the machine language that boots it up. The CoCo 1 disk controllers required 12 volts in addition to the 5 volts supplied on the expansion connector by the CoCo 2 and CoCo 3. These controllers have proven unreliable at 2 MHz.

An Unbootable Disk

I have a CoCo 3 with double-sided drive as /d0 and /d2 and a single-sided drive as Drive 1. I just bought OS-9 Level II, followed the directions in the Radio Shack manual and The Complete Rainbow Guide to OS-9 Level II *and used* `Config` *to enable my double-sided drive. I wound up with an unbootable disk. Where did I go wrong?*

Wayne B. Sylvis
Punxsutawney, Pennsylvania

℞ One possibility is that your double-sided drive is hardware-configured to act as two single-sided drives. If this is true, you need to disable this hardware patch for true two-sided operation in OS-9 Level II. On the *"Down-Under"* controllers, formerly sold by J&R, the hardware patch consisted of a jumper wire connecting two lands on the edge connector. Removing the jumper wire disabled the patch on it. Your controller may have a similar patch wire.

3½-Inch Floppies

What hardware/software do I need to use a 3½-inch floppy drive with my CoCo?

Leon Price
Manchester, Connecticut

℞ A 3½-inch floppy is electrically equivalent to a 5¼-inch one. The only real problem is transferring software to the smaller media since the CoCo standard is still 5¼-inch media.

The Mind-Boggling Joystick

I have a CoCo 3 that has developed a problem I can't figure out. Recently, in the middle of a game (any game) my Deluxe Joystick ceases to fire. The left/right, up/down works fine, but there is no action on the fire button of either joystick. However, when I replace them with my little "cheapie" that I got originally, the fire button works fine. I cannot believe that the fire button on both joysticks would pick the exact same moment to quit. Often, when the computer's been off for awhile, the Deluxe Joystick works again. Any ideas? By the way, I am using RGB Patch *for a CM-8 before loading the game.*

Garth V. Hunt
Campbellville, Ontario

℞ Since the machine works fine with the "cheapie" joysticks, your computer is probably OK. If one of your joysticks has its fire button shorted or stuck in the pressed position, it could affect the operation of the other one. I'd check the joystick's wiring for a short and check the fire button for proper operation with a voltmeter.

Compatible Drivers

Max-10 *by Colorware does not support the DMP-100. I have a printer driver for* CoCo Max II *that will drive the DMP-100 on my CoCo 3. Are the drivers on my* CoCo Max II *compatible with the drivers on the* CoCo Max 3 *and* Max-10?

Robert L. Johnson
New Orleans

℞ No, the newer software uses the super Hi-Res graphics screens of the CoCo 3 while your old drivers access the older `PMODE` display.

True Lowercase

Recently, I bought an old Line Printer VII (Radio Shack Cat. #26-1167) from a friend. For the most part, it works fine except it won't print what I like to call "hung lowercase letters" (examples — g, j, p, q, and y). Normally, I would expect these lowercase letters to be printed halfway below the line. Is this normal? The service manual doesn't say. If this is normal, and I suspect it is, is there any way to fix it or is there a company I can send it to for repairs?

Wesley Evans
Denver

℞ Fortunately (or unfortunately), there is nothing wrong with your printer. These older 7-pin printers do not support lowercase descenders, which were introduced with the 9-pin variety.

DEFUSR, CHROUT and CSRDON

I have two questions, both relating to information (or lack thereof) given in the CoCo 3 Extended BASIC *manual. I am not clear on how the* `DEFUSR` *command operates. When data is passed from* BASIC *to the ML subroutine, what register or address does it go*

Richard Esposito is the principal engineer for BDM Corporation. He holds bachelor's, master's and doctorate degrees from Polytechnic Institute of Brooklyn. He has been writing about microcomputers since 1980.

Richard Libra is a simulator test operator for Singer Link Simulation Systems Division.

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Pyramix

This fascinating CoCo 3 game continues to be one of our best sellers. ***Pyramix*** is 100% machine language written exclusively to take advantage of all the power in your 128K CoCo 3. The Colors are brilliant, the graphics sharp, the action fast. Written by Jordan Tsvetkoff and a product of ColorVenture.

The Freedom Series

Vocal Freedom

I've got to admit, this is one nifty computer program. ***Vocal Freedom*** turns your computer into a digital voice recorder. The **optional Hacker's Pac** lets you incorporate voices or sounds that you record into your own BASIC or ML programs. This is not a synthesizer. Sounds are digitized directly into computer memory so that voices or sound effects sound very natural. One "off-the-shelf" application for Vocal Freedom is an **automatic message minder.** Record a message for your family into memory. Set Vocal Freedom on automatic. When Vocal Freedom "hears" any noise in the room, it plays the pre-recorded message! Disk operations are supported. VF also tests memory to take advantage of from 64K up to a full 512K. Requires low cost amplifier (RS cat. #277-1008) and any microphone.

Mental Freedom

Would your friends be impressed if your computer could **read their minds?** Mental Freedom uses the techniques of Biofeedback to control video game action on the screen.**Telekinesis?** Yes, you control the action with your thoughts and emotions. And, oh yes, **it talks** in a perfectly natural voice without using a speech synthesizer! Requires Radio Shack's low cost Biofeedback monitor, Cat. #63-675.

BASIC Freedom

Do you ever type in BASIC programs, manually? If you do, you know it can be a real chore. Basic Freedom changes all that. It gives you a **full screen editor** just like a word processor, but **for BASIC programs.** Once loaded in, it is always on-line. It hides invisibly until you call it forth with a single keypress! This program is a must for programers or anyone who types in programs. By Chris Babcock and a product of ColorVenture.

Lightning Series

These three utilities give real power to your CoCo 3.

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This utility requires 512K. Reads your master disk once and then makes superfast multiple disk backups on all your drives! **No need to format blank disks first!** Supports 35, 40 or 80 track drives.

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to? Are the ROM routines as listed on pages 315 to 317 correct and complete as they stand? I have tried to use the `CHROUT`*($A002) and the* `CSRDON`*($A004) subroutines without success. The* `CSRDON` *subroutine is particularly baffling because the entry condition is specified as "none." Yet according to my ROM dump, $A004 contains $A7, which is a* `STA` *code. How can this be? Is the book off or am I? I have an IMC6809 data sheet that I've used to write simple machine language programs, so I am knowledgeable to that extent.*

Charles M. Kay
Cheraw, South Carolina

℞ The information in the BASIC manual is sketchy at best. When data is passed as an argument for one of the `USRn(VALUE)` functions, a value in the range -32768 to 32767 (16 bits) can be passed to the 6809E's S stack as an argument. A `JSR $B3ED` instruction can be used to retrieve this value from the S stack to the D register. The ROM routines in the BASIC manual list the indirect addresses. For example, to use the `CHROUT` routine (similar in function to `INKEY$` in BASIC), you use the instruction `JSR [$A002]`. In my CoCo 3, this statement is logically equivalent to `JSR $A282` (note the absence of the square brackets in this case). In both cases, the `CHROUT` routine takes the character in the A register and puts it to the screen. With regard to `CSRDON`, if you look at addresses $A004 and $A005,you will discover that the "real" or direct address is $A77C. The reason for specification of these routines via indirect addresses is that it gives Tandy and Microsoft the flexibility to alter ROM routine entry points in different versions of ROMs without causing assembly language programmers the anxiety of having to alter code written for previous ROM versions.

Terminal Trouble

I own a CoCo 3, Multi-Pak, 2 drives, CM-8 monitor, two printers and an RS-232 Pak. Therein lies the problem; I like the ability to use a modem and a printer at the same time. However, the 32-character screen width used by the RS-232 Pak is less than adequate for most host systems, especially with the 40- and 80-character screen available with the CoCo 3 software. Is there communications software available that will utilize the 40- and 80-character screens and the RS-232's hardware while bypassing its software, or is there a way to burn a software package into an EPROM and replace the Pak's software chip? I have also had a problem while attempting to download using the Pak. Most BBSs I have used require a carriage return to start the download. However, when I set the Pak for downloading and hit the BREAK *key, I can no longer give the host it's carriage return. Can you suggest a solution?*

Kerry L. Moline
Denver

℞ Three Shareware programs that can accomplish your desires are *Mikeyterm, Greg-E-Term, and Rickey-Term*. All are available for $10 each from their authors. The authors' addresses are:

Michael D. Ward
1807 Cortez
Coral Gables, FL 33134

Greg Miller
9575 Roston Road
Grandledge, MI 48837

Rick Adams
712 Brett Ave.
Rohnert Park, CA 94928

Two-Way Commmunications

I have a CoCo 3 with 512K, 1 DSDD drive, CM-8 monitor, a CGP-220 printer, OS-9, and Multi-Vue. *I also own an Amiga 500 with a VT100 emulation package. This setup works well and I have used it successfully with many host systems. My problem is that I cannot receive characters through the RS-232's port from the Amiga; the moment I type* `tsmon /t1` *my CoCo aborts and responds to nothing except the* CLEAR *key, which still changes me between windows (if I have any open). I can output data at any speed (300-9600 baud) with no problem by typing* `dir /t1`. *This works fine at any speed, but I read in* The Complete Rainbow Guide to OS-9 *that the terminals accessing OS-9 through the internal RS-232 port should have a baud of 300. I have tried it at 300 baud but it still doesn't work. If I type* `build afile </t1`, *the CoCo also stops. Also, when the CoCo stops, even on the previous command where only the input is redirected, periods are sent out the RS-232 and are displayed on the Amiga screen. All the above still happens even if I have no cable connected to the CoCo's RS-232 port. I have also tried this on my brother's CoCo 3 (128K) with the rest of the system configuration the same, with the same results. Is there a problem with my hardware setup or the serial driver, or what? Also, I purchased* Multi-Vue *because it is advertised to be used to create user-friendly interfaces for your developed programs. After opening the package, however, I find that this is not the case. I find that there are no tools for creating icons. Can you suggest a way I can create my own "user-friendly" interface icons?*

Walter Zambotti
Perth, Australia

℞ The current CoCo 3 version (2.01.00) of OS-9 as distributed by Tandy does not support two-way communication over `/t1`. Two-way communication requires `/t2` and a RS-232 Pak. It is possible to write a graphical icon editor in C, BASIC09 or assembly language; two have appeared on Delphi. If you have a file-zapping program such as the Level I *Debug*, you can use it to modify copies of the provided icons, hence defining your own.

Monitor Connections

I own a CoCo 3 and I would like to connect it to a composite monitor. It was used with my IBM PC, for which I now have an EGA monitor. Is there a way to do that?

Robert Dagenais
Quebec

℞ A composite video monitor usually has one or two phono-jack inputs, one for composite video and possibly a second for audio. The CoCo 3 has corresponding jacks on its back so a patch cord of the type normally used to connect VCRs is all you need.

For a quicker response, your questions may also be submitted through RAINBOW's CoCo SIG on Delphi. From the CoCo SIG> prompt, pick RAINBOW Magazine Services, then, at the RAINBOW> prompt, type `ASK` **for "Ask the Experts" to arrive at the EXPERTS> prompt, where you can select the "Doctor ASCII" online form which has complete instructions.**

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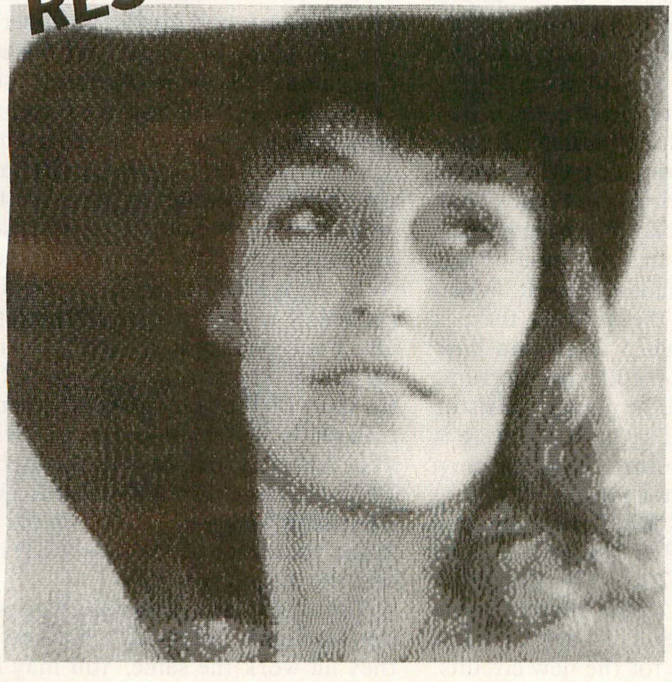
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Light detectors really brighten this final modification

Lights Out!

By Tony DiStefano
Rainbow Contributing Editor

This is the end of our project. Remember, though, we've just touched the surface of CoCo's abilities. You can go beyond this simple project — the possibilities are endless. This time I'll show you how to connect a few more inputs. To do this, we'll delve into the world of optics — light. We can use light to monitor time or trespassers (i.e., determine when it grows dark outside or when someone walks into the light).

Let's start with some electronic theory. Look at Figure 1. Q1 is a symbol for a photo transistor. This one is an NPN. (The *N* stands for Negative and the *P* for Positive.) A transistor has three pins — a base, a collector and an emitter. Figure 2 shows a typical NPN transistor switching circuit. I use the term *switching* because we use it as a simple transistor switch. A simple switch is an SPST (Single-Pole, Single-Throw). The two contacts are the collector and the emitter. Current can only flow from the collector, through the transistor, to the emitter. Examine the circuit in Figure 2. If Point A were connected to ground, there would be no base current flowing from the base of the transistor to the emitter. This causes a high impedance between the collector and the emitter of the transistor (no collector-emitter current). The voltage at Point B would be about the same as VCC.

We'll introduce a base current by raising Point A to VCC. Current will now flow through Resistor R5 and the transistor base and out the emitter, which causes the transistor to conduct. The impedance of the collector-emitter will lower, and current will flow from the collector to the emitter. When this happens, the voltage at Point B lowers as well. If there were enough current flow through the transistor, the voltage at B would drop to 0 volts. The amount of collector current depends on the amount of base current and the *gain* of the transistor. The gain of a transistor is the amplification factor.

The transistors and opto-isolators we will use work in the *saturation* mode, where we design the transistor to be either fully on or fully off. Look at Figure 2 again. When you ground Point A (no base flow), point B is high. When you make Point A high (when base current flows), Point B is low.

Now that we understand the switching transistor, let's look at the photo transistor. The photo transistor is like a regular transistor. It has two pins and a window. The two pins are the collector and the emitter, and the window is like the base of a regular transistor. Examine the circuit surrounding Q1. It looks like the transistor circuit in Figure 2 but has a window instead of a base circuit. This window acts like the base circuit but uses light instead of current. When there is no light in the window, there is no base current; when there's no base current, there's no collector current. The point at which the photo transistor and resistor meet is high. When there is light, that same point is low. We now have a light-activated switch.

The output of this light switch is connected to Pin 2 of U6 (one of eight inputs of a 74LS244). The circuit in Figure 1 is similar to the circuits in the previous three parts. I just deleted a few ICs to make room for the new circuits. U2 is the same; I just added another 74LS244 chip to Pin 9. The software created in the previous parts of this project is also the same. However, today's additions will use different addresses.

Now that we have the photo transmitter, we need an *opto-isolator.* An opto-isolator is a photo transistor and an LED (Light Emitting Diode) together in one package. As the name implies, this device is used to isolate an incoming signal. This device is used in many places. The most common is in televisions with separate video and audio inputs. In today's TVs, there are no line-voltage transformers. Therefore, many components inside a modern TV can have the potential of 117 volts. This is dangerous and can shock you. Any connection made to the TV is made using isolators similar to the one used here. Electrical signals are converted to light signals by an LED and are returned to electrical signals by a photo transistor.

As in all TVs, my circuit is powered by a separate supply. This supply has to be isolated from the 117-volt AC via a transformer. The circuit surrounding ISO1 in Figure 1 is used in places requiring isolation. It is just a switch (SW1) isolated from the rest of the Color Computer. This switch can be used outside or over long distances of wire without the worry that static electricity or lightning will damage the CoCo. The DC adapter is a standard toy adapter found almost anywhere. If you use more than one opto-isolator, you can use the same adapter. I used a 1K resistor in R3, but this resister may be a different value, depending on the maximum current for the LED inside the opto-isolator and the voltage of the adapter. To calculate the resistor value, use the equation R = V/I. In this equation, R is the value of the resistor needed; V is the voltage of the adapter; and I is the current needed to turn on the LED. You will get this value from the specs on the opto-isolator. When the isolator is wired up, close the switch. This causes current to flow through the LED, which in turn activates the photo transistor. When on, the output is low. When the switch is open, the LED is off and the output is high.

There are many photo transistors and opto-isolators on today's market, and they all work the same. You may have to change the values of resistors to match the different types, but you'll need only a volt meter to make sure it's running right. A wide variety of transistors and isolators are on the market; pick one for yourself. They come in

---

Tony DiStefano is a well-known early specialist in computer hardware projects. He lives in Laval Ouest, Quebec. Tony's username on Delphi is DISTO.

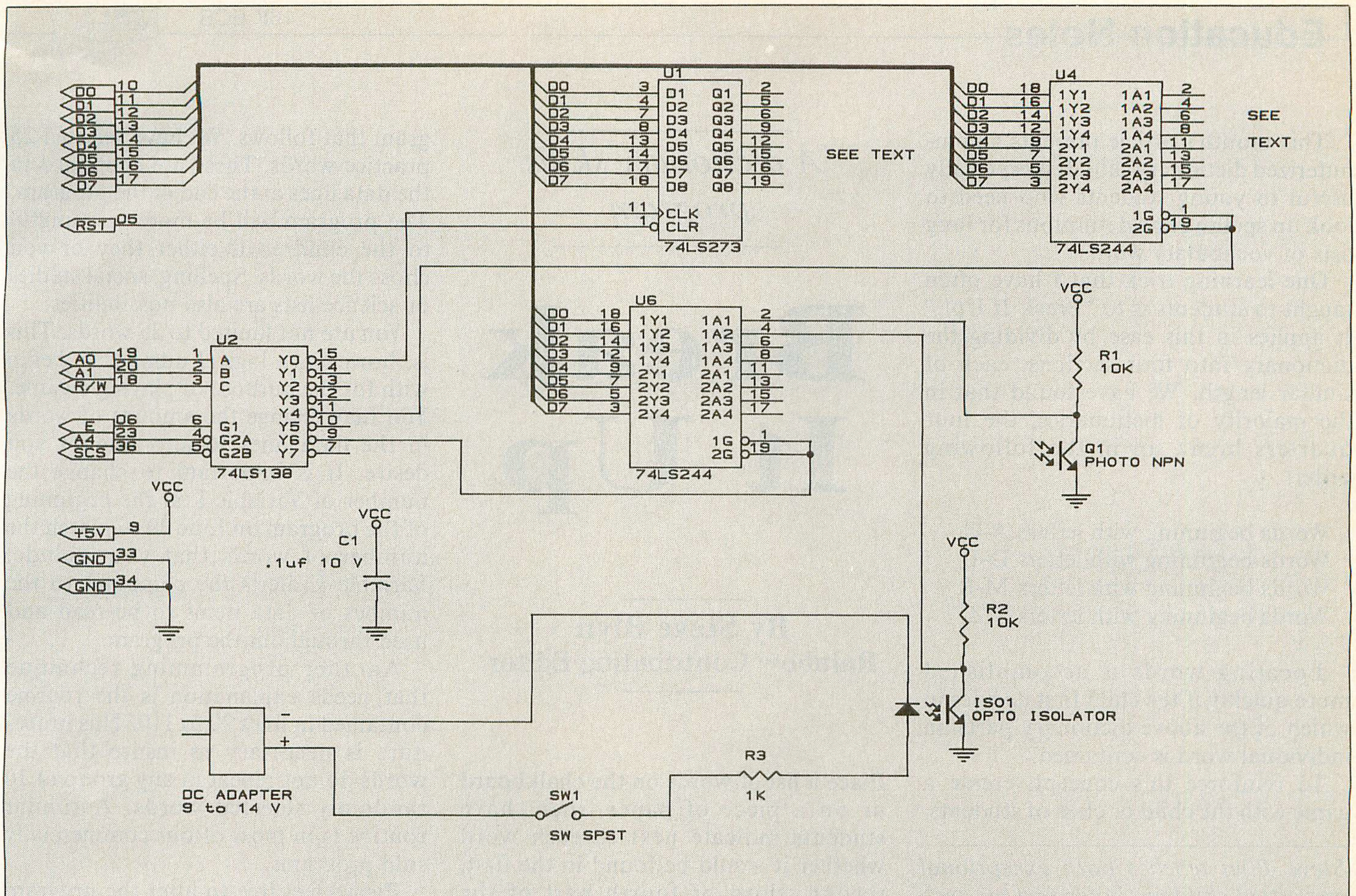
D0
D1
D2
D3
D4
D5
D6
D7
RST
A0
A1
R/W
E
A4
SCS
+5V
GND
GND
VCC
U1
74LS273
CLK
CLR
SEE TEXT
U4
74LS244
SEE TEXT
U2
74LS138
U6
74LS244
1G
2G
C1
.1uf 10 V
R1
10K
Q1
PHOTO NPN
R2
10K
ISO1
OPTO ISOLATOR
R3
1K
SW1
SW SPST
DC ADAPTER
9 to 14 V

Figure 1: The Circuit Board

different shapes and sizes. Some have built-in lenses or tubes. Some can be mounted on doors or motors, and some come with reflective mirrors. Choose the one you need or want to try. There is an entire series of infrared photo transistors and LEDs. You can build a gadget and write software that reads your television's remote control and duplicates it, so your computer controls your television or VCR. Wire your house for security. You can use a couple of IR pairs and have two CoCos talk to each other without wires — your imagination is the only limit.

Now we need only to create the software. Since we are still using the same SCS pin on the CoCo, the addressing area remains from $FF40 to $FF5F. U6 is a read-only device, so only the PEEK command will work in BASIC. If it is connected to Y6 of U2, U6 is located at $FF42. The same software that read the other locations works here. The same condition applies with the bit positions. In Figure 1, Q1 is connected to D0, and ISO1 is connected to D1. Mix and match these inputs as you like. If eight inputs are not enough, you can use another 74LS244 and get another eight inputs. With U2, you can have 32 (4 x 8) inputs and 32 (4 x 8) outputs. If you need more, add another 74LS138 and an inverter.

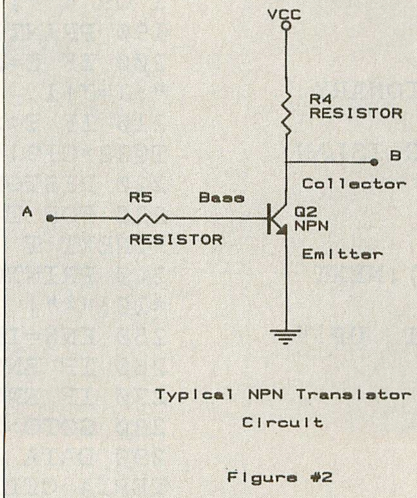
VCC
R4
RESISTOR
B
Collector
A
R5
Base
RESISTOR
Q2
NPN
Emitter
Typical NPN Transistor
Circuit
Figure #2

Figure 2: Typical NPN Transistor Circuit

Constructing the project is simple — just add to the existing board. Add more sockets and chips as you need them. Many electronics stores carry photo transistors and opto-isolators. Radio Shack stores have a limited selection.

In Part 1 of this project, I told you to keep things neat and tight, and this is why. If you have many wires coming off the board, look into a multiwire connector. It helps prevent wires from breaking when you turn the board upside down to work on it. You may want to start again. Design your own circuit to suit your needs. With the experience you now have, you can make it the perfect size. If you are having trouble reading the photo transistors, use a volt meter to measure the output. Make sure the voltage on the collector is at least 3 volts when no light shines on them and no more than .5 volts when there is light. If this is not the case, use a different value resistor between the collector and the VCC.

A dictionary skills program

Break It Up

By Steve Blyn
Rainbow Contributing Editor

This month's article presents a computerized dictionary skill. It is especially useful to young students who need to look up spelling and definitions for long lists of vocabulary words.

One learning trick that I have often taught to students is to "Break It Up!." It applies in this case by dividing the dictionary into four sections, each of similar length. We have found that in the majority of dictionaries, the four quarters break up in the following order:

Words beginning with letters A-C.
Words beginning with letters D-L
Words beginning with letters M-R
Words beginning with letters S-Z

Locating words is accomplished more quickly if the child first decides in which of the above dictionary parts an individual word is contained.

To reinforce this concept, create a game with the child or class of students.

Place a list of words on the chalkboard or on a piece of paper, then, have students indicate next to each word whether it would be found in the first, second, third or fourth part of the dictionary. They may find it easiest to just choose and write a number from one to four.

This game is contained in the program that follows. We have selected 25 practice words. These are contained in the data lines at the end of the program. The program will be more meaningful to the children if either they or you chose the words. Spelling, social studies or science lists are also possibilities.

You are not limited to 25 words. This is, however, a logical number to begin with for the purpose of playing a game. You may change the amount of words in the data lines to any amount you desire. It is important to change the number of Variable L at the beginning of the program on Line 30 to match the number of words that you include. Variable L alerts the computer to the number of data items to be read and used throughout the program.

Another programming technique that needs explanation is the routine contained in lines 90 to 110. This procedure is necessary to insure that the words do not repeat in any group of 10 randomly selected words. A similar routine is in most of our commercially sold programs.

Please feel free to alter the program to suit your students' needs. We, at Computer Island, are always happy to hear of your uses and successes with our programs.

Steve Blyn teaches both exceptional and gifted children, holds two master's degrees and has won awards for the design of programs to aid the handicapped. He owns Computer Island and lives in Staten Island, New York.

The listing: DICTNARY

```
10 REM "BREAK-IT-UP! DICTIONARY
SKILL"
20 REM"STEVE BLYN,COMPUTER ISLAN
D,STATEN ISLAND,NY,1989"
30 L=25:Z=RND(-TIMER)
40 DIM A$(L)
50 FOR W=1 TO L:READ A$(W):NEXT
W
60 CLS0:PRINT@9,"BREAK  IT  UP!"
;
70 R=RND(L)
80 C=C+1:IF C>10 THEN 230
90 A$=A$(R)
100 A$(R)=A$(L)
110 L=L-1
120 B$=LEFT$(A$,1)
130 B=ASC(B$)
140 IF B<68 THEN D=1
150 IF B>67 AND B<77 THEN D=2
160 IF B>76 AND B<83 THEN D=3
170 IF B>82 THEN D=4
180 PRINT@32*C+64,C;".";A$,"1,2,
3 OR 4 ";
190 PRINT@32*C+91,"";:INPUT E
200 IF E=D THEN PLAY"L100CDEFGGG
":J=J+1
210 IF E<>D THEN PLAY"L4C#":PRIN
T@32*C+91,D
220 RESTORE:GOTO 70
230 FOR T=1 TO 3:PLAY"L50GFEDCCC
":NEXT T
240 PRINT@455,"YOUR SCORE IS ";J
*10;"%";
250 EN$=INKEY$
260 IF EN$="E" THEN END
270 IF EN$=CHR$(13) THEN RUN
280 GOTO 250
290 DATA ALGAE,AMEBA,BACILLI,BAC
TERIA,CELLS
300 DATA DISEASE,DRUG,ECOLOGY,FL
OWERS,GENES
310 DATA HABIT,IMAGE,LARVA,MAMMA
L,NEURON
320 DATA NUCLEUS,ORGAN,PEPSIN,RE
FLEX,SALIVA
330 DATA SEPALS,THEORY,VEIN,XYLE
M,YEAST
```

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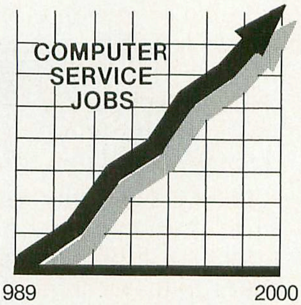

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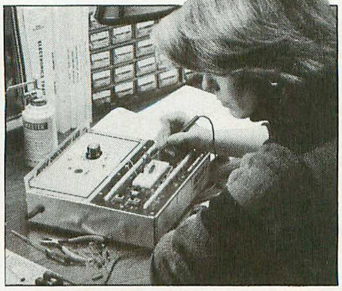

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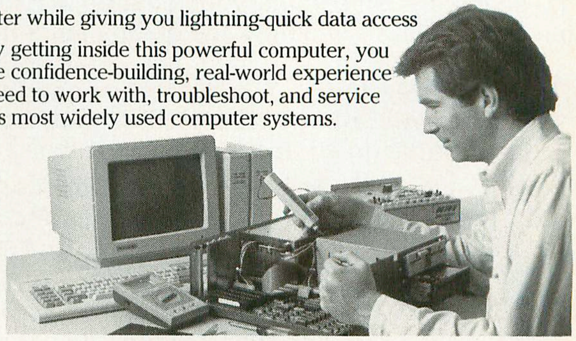

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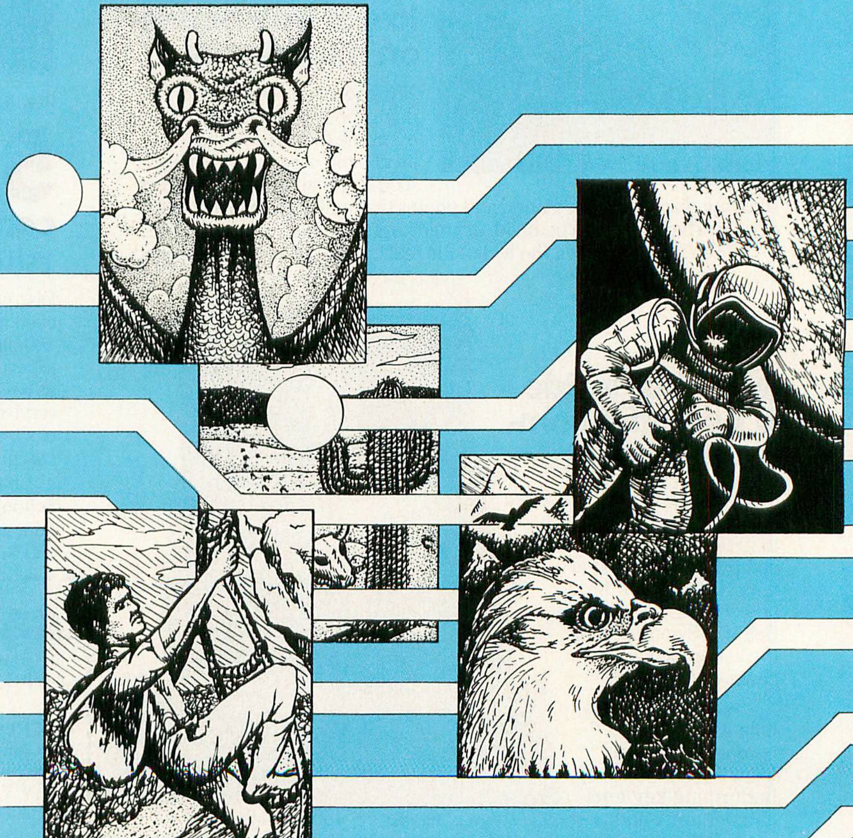

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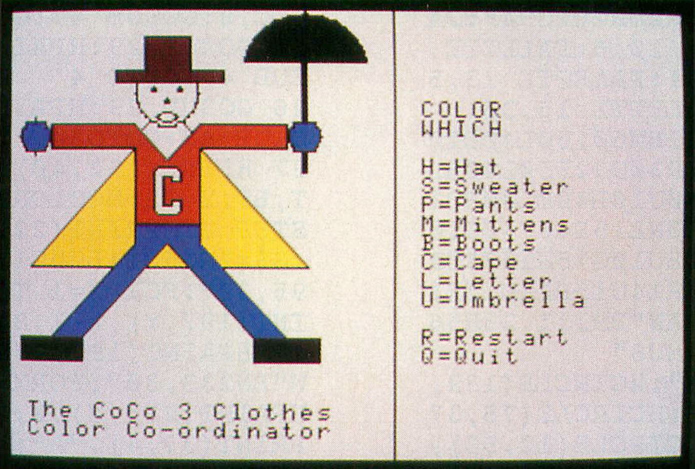
This program helps children develop good fashion sense

The Color Coordinator

By Bill Bernico



```
COLOR
WHICH

H=Hat
S=Sweater
P=Pants
M=Mittens
B=Boots
C=Cape
L=Letter
U=Umbrella

R=Restart
Q=Quit

The CoCo 3 Clothes
Color Co-ordinator
```

Being an observer of people, I've noticed how fashion-conscious society is today, though a particular subgroup appears blindly unconscious of acceptable dress codes. There's no nice way to say it: Some people just don't know how to dress.

With this in mind, I designed *Color Coordinator* to give children a helping hand with fashion sense. The program lets them picture what certain color combinations look like before trying on dozens of outfits.

By selecting the color for articles of clothing (hat, sweater, pants, boots, mittens, cape and umbrella), the computer displays the outfit on CoCo Kid, a handsome figure serving as a mimic for the child, and with whom he or she will perform fashion experiments. Once an article is selected, a color chart appears, offering sixteen choices. Color choices are numbered 0 through 9 and A through F. To alter the represented colors, simply change the `PALETTE` values in Line 3.

One important note on changing colors. An already colored article of clothing can be changed simply by pressing that number or letter, and the program will paint over the section. The only exception is that if you color something black, it will remain black until you restart the program by pressing R from the menu. To quit the menu press Q.

If you'd like to change or enhance the program or add additional articles of clothing like socks, earmuffs, belt, etc., simply add their letter to the menu and branch off accordingly.

(Questions or comments regarding this program may be directed to the author at 708 Michigan Ave., Sheboygan, WI 53081. Please enclose an SASE when requesting a reply.)

Bill Bernico is the author of over 200 Color Computer programs and is a frequent RAINBOW *contributor whose hobbies include golf, writing music and programming. Bill is a drummer in a rock band and lives in Sheboygan, Wisconsin.*

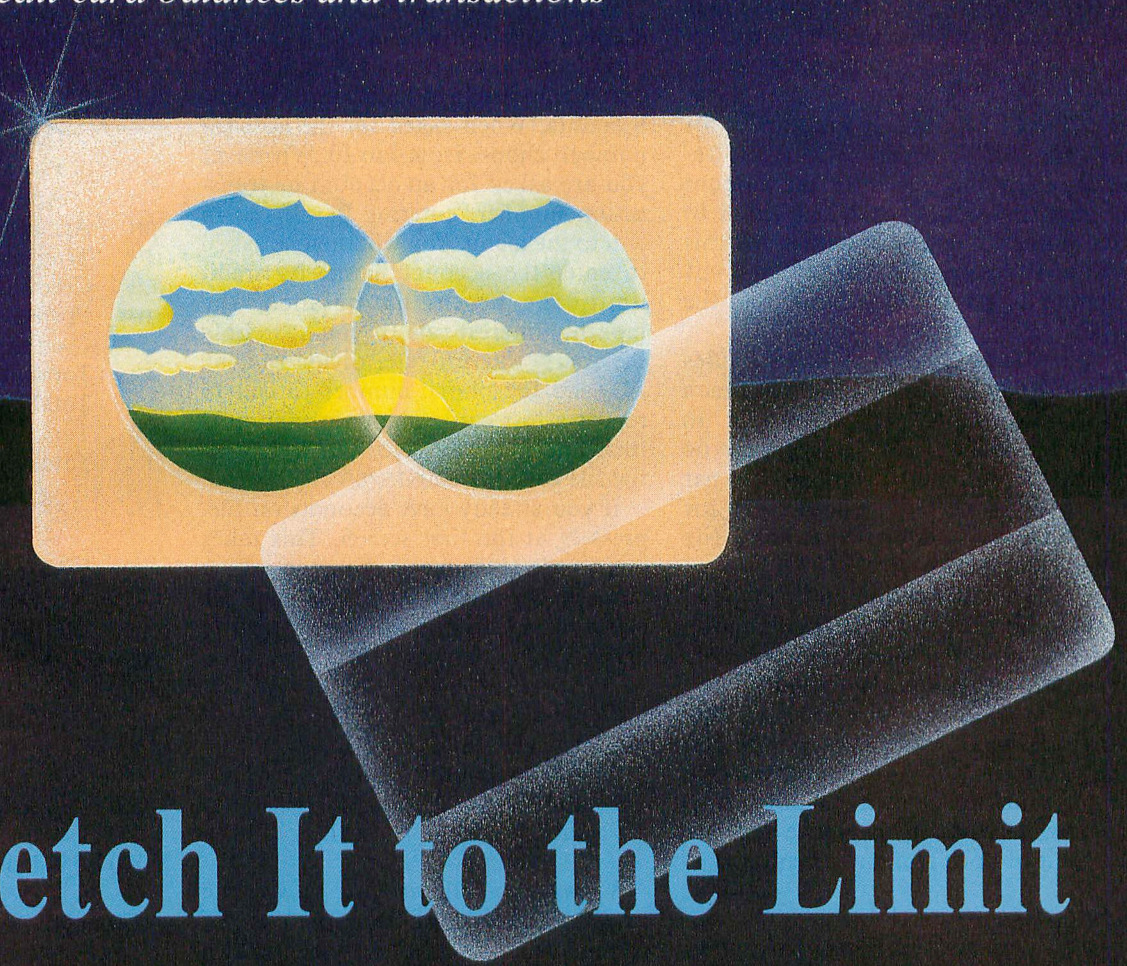
Listing 1: CRDINATE

```
0 'COPYRIGHT 1989  FALSOFT, INC
1 'CC3CCC
CoCo3 Clothes Color Co-ordinator

2 '(C)1988 FROM
   BILL BERNICO SOFTWARE

3 CLEAR 300:POKE 65497,0:ON BRK
GOTO 48:HSCREEN 2:HCLS 4:HCOLOR
8,4:RGB:R$="NUNDNRNLNGNF":L$="S8
L4HU8ER4FD2L2UL2D6R2UR2D2GS4":PA
LETTE 9,56:PALETTE 10,6:PALETTE
11,53:PALETTE 12,61:PALETTE 13,5
2:PALETTE 14,39:PALETTE 15,35
4 HDRAW"BM180,0D191BM60,50L40D10
R40G50NR40E50D40U8R30U32F50L40BL
15NL20BR15R40H50R40U10L40BL30BD1
0D40G40L15D10R30U10NL15E40F40D10
R30U10L30R15H40U40BU10G15H15F3E3
BR17F3BU21R15L50U5R14U15R21D15R1
5D5BM79,88"+L$:HDRAW"BM111,23R56
L29ND25LD25BD14D8RNU8"
5 HDRAW"RU8BU14U25":HCIRCLE(139,
30),30,8,1,.55,.96:HCIRCLE(75,37
),15,8,1,.96,.55:HCIRCLE(12,55),
8:HCIRCLE(138,55),8:HDRAW"BM69,3
5"+R$+"BR12"+R$+"BM75,40"+R$:HCI
RCLE(75,47),5,8,.5:HPRINT(24,5),
"COLOR":HPRINT(24,6),"WHICH":HPR
INT(24,8),"H=Hat"
6 HPRINT(24,9),"S=Sweater":HPRIN
T(24,10),"P=Pants":HPRINT(24,11)
,"M=Mittens":HPRINT(24,12),"B=Bo
ots":HPRINT(24,13),"C=Cape":HPRI
NT(24,14),"L=Letter":HPRINT(24,1
5),"U=Umbrella":HPRINT(24,17),"R
=Restart":HPRINT(24,18),"Q=Quit"
:PLAY"O4T20F"
7 HPRINT(1,21),"The CoCo 3 Cloth
es":HPRINT(1,22),"Color Co-ordin
ator"
8 I$=INKEY$:IF I$=""THEN 8
9 IF I$="H"THEN GOSUB 27:GOTO19
10 IF I$="S"THEN GOSUB27:GOTO20
11 IF I$="P"THEN GOSUB27:GOTO21
12 IF I$="B"THEN GOSUB27:GOTO22
13 IF I$="M"THEN GOSUB27:GOTO23
14 IF I$="C"THEN GOSUB27:GOTO24
15 IF I$="L"THEN GOSUB27:GOTO25
16 IF I$="U"THEN GOSUB27:GOTO26
17 IF I$="R"THEN RUN
18 IF I$="Q"THEN 48 ELSE 8
19 GOSUB 29:HPAINT(75,31),C,8:GO
SUB 47:GOTO 4
20 GOSUB 29:HPAINT(75,67),C,8:GO
SUB 47:GOTO 4
21 GOSUB 29:HPAINT(75,97),C,8:GO
SUB 47:GOTO 4
22 GOSUB29:HPAINT(25,145),C,8:HP
AINT(140,145),C,8:GOSUB47:GOTO4
23 GOSUB 29:HPAINT(12,55),C,8:HP
AINT(138,55),C,8:GOSUB 47:GOTO 4
24 GOSUB 29:HPAINT(50,105),C,8:H
PAINT(75,105),C,8:HPAINT(115,105
),C,8:GOSUB 47:GOTO 4
25 GOSUB 29:HPAINT(71,85),C,8:GO
SUB 47:GOTO 4
26 GOSUB 29:HPAINT(125,22),C,8:G
OSUB 47:GOTO 4
27 HLINE(192,40)-(269,150),PRESE
T,BF:Y=32:HCOLOR8:FOR X=0 TO 18
STEP 2:HPRINT(22,X+4),X/2:NEXT X
:S$="R25D11L25U11BD16":HDRAW"BM1
95,30":FOR X=1 TO 10:HDRAWS$:HPA
INT(197,Y),X-1,8:Y=Y+17:NEXT X
28 HPAINT(197,178),9,8:Y=32:HDRA
W"BM233,30":FORX=10TO15:HDRAWS$:
HPAINT(235,Y),X,8:Y=Y+17:NEXTX:H
PRINT(33,4),"A":HPRINT(33,6),"B"
:HPRINT(33,8),"C":HPRINT(33,10),
"D":HPRINT(33,12),"E":HPRINT(33,
14),"F":HPRINT(23,1),"WHICH COLO
R?":PLAY"O5T20F":RETURN
29 C$=INKEY$:IF C$=""THEN 29
30 IF C$="0"THEN C=0:RETURN
31 IF C$="1"THEN C=1:RETURN
32 IF C$="2"THEN C=2:RETURN
33 IF C$="3"THEN C=3:RETURN
34 IF C$="4"THEN C=4:RETURN
35 IF C$="5"THEN C=5:RETURN
36 IF C$="6"THEN C=6:RETURN
37 IF C$="7"THEN C=7:RETURN
38 IF C$="8"THEN C=8:RETURN
39 IF C$="9"THEN C=9:RETURN
40 IF C$="A"THEN C=10:RETURN
41 IF C$="B"THEN C=11:RETURN
42 IF C$="C"THEN C=12:RETURN
43 IF C$="D"THEN C=13:RETURN
44 IF C$="E"THEN C=14:RETURN
45 IF C$="F"THEN C=15:RETURN
46 GOTO 29
47 HLINE(184,7)-(278,185),PRESET
,BF:RETURN
48 POKE65496,0:RGB:WIDTH32:END
```

Keep track of credit card balances and transactions



Stretch It to the Limit

By Mary and James Lamonica

This program is about limits. Here's a scenario: You find yourself in Radio Shack in the middle of a spectacular sale and finally decide to get that new piece of hardware you've always wanted. You walk to the counter to pay and hand the clerk your credit card. After a few minutes, to your shocked surprise the clerk says those five embarrassing words, "You are over your limit!"

Credit Card Balance can't raise your credit limit, but it can help you keep track of credit card transactions and balances. The program allows you to keep track of up to ten credit accounts of up to 300 transactions each. It automatically figures your balance and projects the monthly interest for that account.

Ten accounts of 300 transactions each, with each transaction giving the date, place and amount, requires over 108K of memory, obviously greater than the CoCo 2's capacity. However, if you have a disk drive, you can use it for additional memory. This is done by creating record files on the disk and only accessing those records needed at any one time. Line 6140 gives an example of how to open a direct access file.

The `OPEN"D"` command tells the computer to open a direct access file. When you use the `OPEN"I"` or `OPEN"O"` commands, you are opening for input or output of a sequential file. Data is saved one piece after another. With a direct access file, data is saved in parts called records. You can enter and call up any part of the file at any time. In a sequential file, you must read in the entire file.

The number 2 tells the computer you are using Buffer 2 to input and output data. `F$` is the filename, or in this case, the name of the credit card. The filename may not be longer than eight characters, so we shorten it by using the `LEFT$` command in Line 6130. The file must have the extension `/DAT`. The `,36` at the end of the line tells the computer that each record is 36 characters long.

The Lamonicas live in El Paso, Texas, where Mary teaches algebra and consumer math at Irvin High School. James teaches social studies at Henderson Middle School.

In Line 6160 the record divides into three fields using the `FIELD` command. You must tell the computer how long each field is going to be.

Once again the number 2 refers to Buffer 2. The command `8ASTD$(1)` tells the computer to reserve eight characters of space for the command `TD$(1)`, which in this case is the date. `20ASTD$(2)` reserves 20 characters for the transaction. And `8ASTD$(3)` reserves eight characters for the amount of each transaction. It is important to save numeric values as strings for this type of filing system. The `GET` and `PUT` commands get or put records onto the disk.

Your Tandy CoCo disk drive divides data into 68 granules of 2,304 bytes each for a total of 156,672 bytes. At 36 characters per record, we can save 64 records per granule or 4352 records per disk. Unfortunately, we need room for the program and an organizing file called `ACCOUNTS`.

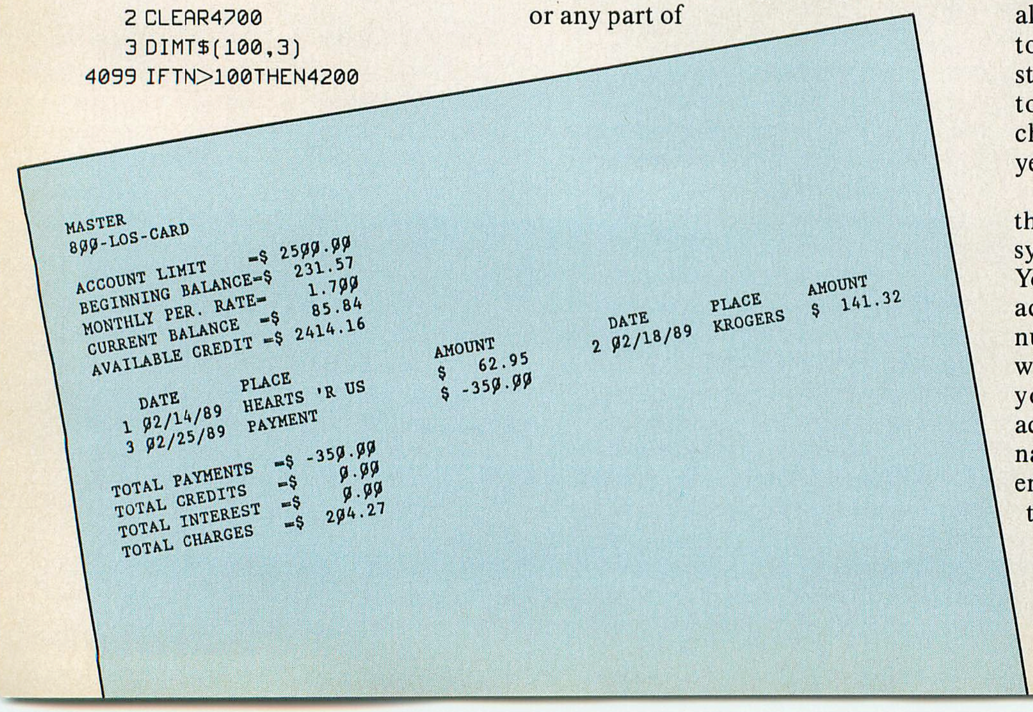
For more information on this type of data storage, refer to Page 49 of Tandy's *Color Computer Disk System, Owners Manual & Programming Guide.*

The one major drawback to this system is its slowness. Every time you need data, the CoCo must go to the disk rather than to its own memory. It is worthwhile, though, if you've reached the limit of your computer memory.

Getting Started

First you need a blank formatted disk, which must remain in the drive while you are using the program. Enter the program into your CoCo. If you have only a 16K machine, change lines 2, 3 and 4099 to the following:

```
   2 CLEAR4700
   3 DIMT$(100,3)
4099 IFTN>100THEN4200
```



```
MASTER
800-LOS-CARD

ACCOUNT LIMIT    =$ 2500.00
BEGINNING BALANCE=$  231.57
MONTHLY PER. RATE=     1.700
CURRENT BALANCE  =$   85.84
AVAILABLE CREDIT =$ 2414.16

   DATE     PLACE              AMOUNT          DATE     PLACE     AMOUNT
 1 02/14/89 HEARTS 'R US       $   62.95     2 02/18/89 KROGERS   $  141.32
 3 02/25/89 PAYMENT            $ -350.00

TOTAL PAYMENTS   =$ -350.00
TOTAL CREDITS    =$    0.00
TOTAL INTEREST   =$    0.00
TOTAL CHARGES    =$  204.27
```

This allows only 100 transactions for each account. Save the program to the new disk. The program is 5.8K long, but it uses over 26K so Line 1 clears out the graphics pages.

When you run the program, press Y if you have no existing accounts on the disk. This takes you to the subroutine that allows you to establish up to 10 new accounts. When asked for the account number, choose from 1 to 10. Whenever you are asked for an account or transaction number, entering 0 will return you to the menu. You will then be asked to enter the account name, its credit limit, the beginning balance, the monthly interest rate (if you have only the yearly interest rate, divide that by 12), and the phone number to call to report a lost card. This information is then automatically saved into a sequential file called `ACCOUNTS/DAT`.

If you already have accounts on file, press N at the first screen. This takes you to the main menu. You can return here by pressing 0 any time you are asked for an account number. Here you are given five choices:

View Data	(1)
Print Data	(2)
Add Accounts	(3)
Add Data	(4)
Edit Data	(5)

View Data allows you to see the transactions for each account. You can choose which transaction you want to see and then move through all of them with the up- and down-arrow keys. At the bottom of the screen a summary of the account is given. This is done for each function.

Print Data allows you to print out all or any part of the transaction you want. It asks you which transaction to start and end with, allowing the computer to create a printout to compare with your monthly statement. The totals printed at the bottom are for the transaction set you choose. This allows for monthly or yearly totals.

`A$`	Array for the account data
	Account name
	Account phone number
`A`	Array for the numeric account data
	Account limit
	Beginning balance
	Monthly periodic interest rate
`T$`	Array for transaction data
	Date of transaction
	Place of transaction
	Amount of transaction
`AN`	Account number
`TN`	Transaction or record number
`CU`	Credit used
`IP`	Projected interest payment
`C`	Credits to accounts
`TP`	Total payments
`TC`	Total credits
`TI`	Total interest
`T`	Total charges

Variable List

1-34	Set up the program and creates main menu
1000-1200	Allow for viewing data
2000-2240	Print routine
3000-3150	Allow for adding new accounts
4000-4215	Allow for adding transactions
5000-5280	Allow for editing of transactions
6000-6050	Routine to print accounts on the screen
6060-6090	Rountine to print account summary on the screen
6100-6250	Get account data from the disk

Program Line Summary

The Add Accounts function allows the addititon of more accounts to the system with a maximum number of 10. You can also use this screen to delete an account. Simply choose an account number already in use, and enter "" when asked for the account name. If you accidentally choose the wrong account number, enter Q in the account name and start over. As soon as you enter a new account name, it appears on the screen next to its number.

The Add Data function is the heart of the program. Here, you can add individual transactions as they occur, providing a current account of your available credit.

There are three key words to be aware of. When the program asks for place, put the name of the business where you used the credit card. To deduct payments or credits from your account, type `PAYMENT` or `CREDIT` for the place. You do not need to enter a negative amount. To enter interest charges, type `INTEREST`.

Edit Data allows you to make corrections if you enter an incorrect amount, date or place. The program will even adjust to changing charges to credits or payments.

(Questions or comments may be directed to the authors at 10456 Orpheus, El Paso, TX 79924. Please enclose an SASE when requesting a reply.) ☐

30	239	4170	223
1140	45	5110	45
2140	201	5240	216
2214	137	6100	86
2228	183	END	231
3130	10		

The Listing: `CREDIT`

```
0 'COPYRIGHT 1989  FALSOFT,INC
1 PMODE0:PCLEAR1
2 CLEAR14000
3 DIMT$(300,3)
5 DIMA$(10,2):DIMA(10,3)
6 DATA DATE,PLACE,AMOUNT
10 CLS(0):PRINT@64,"":PRINT@64,"
IF YOU HAVE NO ACCOUNTS ON FILE,
PRESS <Y> AND YOU WILL GO TO THE
ADD ACCOUNTS SUBROUTINE.
  PRESS <N> TO GO TO MAIN MENU"
11 I$=INKEY$
12 IFI$="Y"ORI$="y"THENGOSUB3000
:GOTO15
13 IFI$="N"THEN15
14 IFI$<>"Y"ORI$<>"N"THEN11
15 OPEN"I",#1,"ACCOUNTS/DAT"
16 FORX=1TO10:FORY=1TO2:INPUT#1,
A$(X,Y):NEXTY:FORZ=1TO3:INPUT#1,
A(X,Z):NEXTZ:NEXTX
17 CLOSE#1
19 CLS(0):PRINT@73,"credit";:PRI
NT@80,"cards";
20 PRINT@168,"VIEW DATA   (1)";:
PRINT@200,"PRINT DATA  (2)";:PRI
NT@232,"ADD ACCOUNT (3)";:PRINT@
264,"ADD DATA    (4)";:PRINT@296
,"EDIT DATA   (5)";:PRINT@359,"C
HOOSE A FUNCTION";
30 I$=INKEY$
31 IFI$=""THEN30
32 ONVAL(I$)GOSUB1000,2000,3000,
4000,5000
34 GOTO19
1000 CLS(6):PRINT@11,"view";:PRI
NT@16,"data";
1005 CLOSE#2
1010 GOSUB 6000
1020 GOSUB6100
1025 IFAN=0THENCLOSE#2:RETURN
1030 CLS(6):PRINT@11,"view";:PRI
NT@16,"data";
1040 GOSUB6060
1050 PRINT@160,"INPUT TRANSACTIO
N NUMBER";:INPUTVT
1055 IFVT=0THEN1190
1060 IF VT<0 OR VT>TN THEN 1050
1070 PRINT@160,"":PRINT@160,"UP
& DOWN ARROWS TO VIEW  Q=QUIT";
1080 FOR X=1TO3
1090 READD$
```

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```
1100 PRINT@192+(X*32),D$+"="+T$(
VT,X)
1105 PRINT@240,"TRANSACTION";VT
1110 NEXTX
1120 RESTORE
1130 I$=INKEY$
1140 IF I$="Q" THEN 1190
1150 IF I$=CHR$(10) THEN VT=VT-1
1155 IF VT<1 THEN VT=TN
1160 IF I$=CHR$(94) THEN VT=VT+1
1165 IF VT>TN THEN VT=1
1170 IFI$=CHR$(10) OR I$=CHR$(94
) THEN 1080
1180 GOTO 1130
1190 CLOSE#2:TN=0:VT=0
1200 GOTO 1000
2000 REM PRINT ROUTINE
2010 CLS(2):PRINT@12,"print";:PR
INT@18,"data";
2020 GOSUB6000
2030 GOSUB6100
2040 IFAN=0THENCLOSE#2:RETURN
2050 CLS(2):PRINT@12,"print";:PR
INT@18,"data";
2060 GOSUB6060
2070 CLOSE#2
2080 PRINT@160,"ENTER THE RANGE
OF TRANSACTIONS"
2090 PRINT@224,"START AT=";:INPU
TST:PRINT@240,"END WITH=";:INPUT
ET
2095 IFST<1 OR ET>TN THEN 2090
2100 PRINT#-2,CHR$(27)CHR$(23)
2110 PU$="$#####.##"
2120 PRINT#-2,A$(AN,1)
2130 PRINT#-2,A$(AN,2)
2135 PRINT#-2,""
2140 PRINT#-2,"ACCOUNT LIMIT
=";:PRINT#-2,USINGPU$;A(AN,1)
2150 PRINT#-2,"BEGINNING BALANCE
=";:PRINT#-2,USINGPU$;A(AN,2)
2160 PRINT#-2,"MONTHLY PER. RATE
=";:PRINT#-2,USING"#####.###";A(
AN,3)
2170 PRINT#-2,"CURRENT BALANCE
=";:PRINT#-2,USINGPU$;A(AN,2)+CU
2180 PRINT#-2,"AVAILABLE CREDIT
=";:PRINT#-2,USINGPU$;A(AN,1)-(A
(AN,2)+CU)
2184 PRINT#-2,""
2185 H$="    DATE       PLACE
           AMOUNT            DAT
E     PLACE                 AMOU
NT"
2186 PRINT#-2,H$
2190 FOR X=ST TO ET STEP 2
2195 IF(X+1)=82 OR (X+1)=162 OR
(X+1)=242 THENPRINT#-2,CHR$(12):
PRINT#-2,"":PRINT#-2,"":PRINT#-2
,H$H$
2200 PRINT#-2,USING"###";X;:PRIN
T#-2," ";T$(X,1);"  ";T$(X,2);"
";:PRINT#-2,USINGPU$;VAL(T$(X,3)
);
2213 Y=X+1
2214 IF Y>TN THEN PRINT#-2,"":GO
TO2216
2215 PRINT#-2,"    ";:PRINT#-2,U
SING"###";Y;:PRINT#-2," ";T$(Y,1
);"  ";T$(Y,2);" ";:PRINT#-2,USI
NGPU$;VAL(T$(Y,3))
2216 IFLEFT$(T$(X,2),7)="PAYMENT
"THENTP=TP+VAL(T$(X,3))
2217 IFLEFT$(T$(Y,2),7)="PAYMENT
"THENTP=TP+VAL(T$(Y,3))
2218 IFLEFT$(T$(X,2),6)="CREDIT"
THENTC=TC+VAL(T$(X,3))
2219 IFLEFT$(T$(Y,2),6)="CREDIT"
THENTC=TC+VAL(T$(Y,3))
2220 IFLEFT$(T$(X,2),8)="INTERES
T"THENTI=TI+VAL(T$(X,3))
2221 IFLEFT$(T$(Y,2),8)="INTERES
T"THENTI=TI+VAL(T$(Y,3))
2222 IF VAL(T$(X,3))>0 THEN T=T+
VAL(T$(X,3))
2223 IF VAL(T$(Y,3))>0 THEN T=T+
VAL(T$(Y,3))
2224 NEXTX
2225 PRINT#-2,"":PRINT#-2,"TOTAL
 PAYMENTS  =";:PRINT#-2,USINGPU$
;TP
2226 PRINT#-2,"TOTAL CREDITS   =
";:PRINT#-2,USINGPU$;TC
2227 PRINT#-2,"TOTAL INTEREST  =
";:PRINT#-2,USINGPU$;TI
2228 PRINT#-2,"TOTAL CHARGES   =
";:PRINT#-2,USINGPU$;T-TI
2230 PRINT#-2,CHR$(12)
2240 TP=0:TC=0:TI=0:T=0:GOTO2000
3000 CLS(3):I$=""
3005 PRINT@11,"add accounts";
3010 GOSUB6000
3020 PRINT@384,"INPUT THE ACCOUN
T NUMBER";:INPUTAN
3025 IFAN=0THENRETURN
3030 PRINT@384,"":PRINT@384,"ACC
OUNT NAME";:INPUTA$(AN,1)
3035 GOSUB6000
3040 PRINT@384,"":PRINT@384,"ACC
OUNT LIMIT";:INPUTA(AN,1)
3050 PRINT@384,"":PRINT@384,"BEG
INNING BALANCE";:INPUTA(AN,2)
3060 PRINT@384,"":PRINT@384,"MON
THLY INTEREST %";:INPUTA(AN,3)
3070 PRINT@384,"":PRINT@384,"LOS
T CARD PHONE #";:INPUTA$(AN,2)
3080 PRINT@384,"":PRINT@384,"ADD
 ANOTHER ACOUNT (Y/N)";:INPUTY$
```

```
3090 IFY$="Y"THEN3000
3100 OPEN"O",#1,"ACCOUNTS/DAT"
3110 FORX=1TO10
3120 FORY=1TO2:WRITE#1,A$(X,Y):N
EXTY
3130 FORZ=1TO3:WRITE#1,A(X,Z):NE
XTZ
3140 NEXTX
3150 CLOSE#1:RETURN
4000 CLS(4):GOSUB6000
4010 PRINT@13,"add";:PRINT@17,"d
ata";
4020 GOSUB6100
4030 IFAN=0THENCLOSE#2:RETURN
4090 CLS(4):PRINT@13,"add";:PRIN
T@17,"data";
4098 GOSUB6060
4099 IFTN>300THEN4200
4100 PRINT@96,"ENTER DATA FOR TR
ANSACTION";TN+1
4103 FIELD#2,8ASTD$(1),20ASTD$(2
),8ASTD$(3)
4105 TN=TN+1
4110 FORX=1TO3
4120 READD$
4130 PRINT@128+(X*32),"ENTER THE
```

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```
 ";D$;:INPUTT$(TN,X)
4132 IFT$(TN,X)="Q"THENRESTORE:G
OTO4200
4134 IFT$(TN,2)="PAYMENT"ORT$(TN
,2)="CREDIT"THENC=VAL(T$(TN,3)):
C=C*-1:T$(TN,3)=STR$(C)
4140 LSETTD$(X)=T$(TN,X)
4150 NEXTX
4152 RESTORE
4154 PUT#2,TN
4156 GOSUB6060
4160 PRINT@320,"ENTER ANOTHER TR
ANSACTION (Y/N)"
4170 I$=INKEY$
4180 IFI$="Y"THEN4090
4190 IFI$="N"THEN4200
4195 IFI$<>"Y"ORI$<>"N"THEN4170
4200 CU=0:TN=O:CLOSE#2
4210 GOTO4000
4215 GOSUB6000
5000 CLS(5):PRINT@12,"edit";:PRI
NT@17,"data";
5010 GOSUB6000
5020 GOSUB6100
5025 IFAN=0THENCLOSE#2:RETURN
5030 CLS(5):PRINT@12,"edit";:PRI
NT@17,"data";
5040 GOSUB6060
5050 PRINT@160,"INPUT TRANSACTIO
N # TO EDIT";:INPUTVT
5060 IF VT<0 OR VT>TN THEN 5050
5065 IFVT=0THEN5270
5070 PRINT@160,"PRESS 1 2 OR 3 T
O EDIT OR Q=QUIT";
5080 FORX=1TO3
5090 READD$
5100 PRINT@192+(X*32),"<";X;">";
D$+"="+T$(VT,X)
5110 NEXTX
5120 RESTORE
5130 I$=INKEY$
5140 IF I$="Q" THENRETURN
5150 IF VAL(I$)<1 OR VAL(I$)>3 T
HEN 5130 ELSE 5160
5160 FORX=1TO3:PRINT@192+(X*32),
"":NEXTX
5170 FORX=1TOVAL(I$):READD$:NEXT
X
5180 PRINT@224,"CURRENT "+D$+"="
+T$(VT,VAL(I$))
5190 PRINT@289,"CHANGE TO=";:INP
UTT$(VT,VAL(I$))
5200 IFT$(VT,VAL(I$))="Q"THEN500
0
5203 IFVAL(T$(VT,3))<0ANDLEFT$(T
$(VT,2),7)="PAYMENT"ORVAL(T$(VT,
3))<0ANDLEFT$(T$(VT,2),6)="CREDI
T"THEN5210
5205 IFLEFT$(T$(VT,2),7)="PAYMEN
T" OR LEFT$(T$(VT,2),6)="CREDIT"
 THEN C=VAL(T$(VT,3)):C=C*-1:T$(
VT,3)=STR$(C):GOTO5210
5206 IFLEFT$(T$(VT,2),7)<>"PAYME
NT"ORLEFT$(T$(VT,2),6)<>"CREDIT"
THENC=ABS(VAL(T$(VT,3))):T$(VT,3
)=STR$(C)
5210 GOSUB6060
5240 FIELD#2,8ASTD$(1),20ASTD$(2
),8ASTD$(3)
5250 FORX=1TO3:LSETTD$(X)=T$(VT,
X):NEXTX
5260 PUT#2,VT
5270 RESTORE:TN=0:VT=0:CLOSE#2
5280 GOTO5000
6000 REM PRINTS ACCOUNTS ON SCRE
EN
6010 FORX=1TO5
6020 PRINT@(2+(64*X)),X;LEFT$(A$
(X,1),10);
6030 PRINT@(16+(64*X)),(X+5);LEF
T$(A$(X+5,1),10);
6040 NEXTX
6050 RETURN
6060 CU=0:FORX=1TOTN:CU=CU+VAL(T
$(X,3)):NEXTX
6065 IP=(A(AN,3)/100)*(A(AN,2)+C
U)
6070 PRINT@384,"CREDIT LINE=";A(
AN,1):PRINT"USED=";A(AN,2)+CU:PR
INT"AVAILABLE=";INT(A(AN,1)-(A(A
N,2)+CU))
6075 PRINT"APPROXIMATE INTEREST=
";:PRINTUSING"####.##";IP;
6080 PRINT@32,TN;"TRANSACTIONS O
N ";A$(AN,1)
6090 RETURN
6100 TN=0:PRINT@384,"INPUT THE A
CCOUNT NUMBER";:INPUTAN
6110 IFAN<0 OR AN>10 THEN 6100
6112 IF AN=0 THEN RETURN
6115 IFA$(AN,1)=""THEN6100
6120 PRINT@384,"":PRINT@384,"LOA
DING DATA FOR ";A$(AN,1)
6130 IFLEN(A$(AN,1))>8THENF$=LEF
T$(A$(AN,1),8)ELSEF$=A$(AN,1)
6135 FORX=1TO300:T$(X,3)="":NEXT
X
6140 OPEN"D",#2,F$+"/DAT",36
6150 IFLOF(2)=0THENRETURN
6160 FIELD#2,8ASTD$(1),20ASTD$(2
),8ASTD$(3)
6170 TN=TN+1
6180 GET#2,TN
6190 FORX=1TO3
6200 T$(TN,X)=TD$(X)
6210 NEXTX
6230 PRINT@480,"RECORD #";TN;
6240 IF LOF(2) <> TN THEN 6170
6250 RETURN
```

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- Don't send us anything owned by someone else; this means no game screens, digitized images from TV programs or material that's already been submitted elsewhere. A digitized copy of a picture that appears in a book or magazine is ***not*** an original work.
- Along with your entry, send a cover letter with your name, address and phone number, detailing how you created your picture (what programs you used, etc.). Please include a few facts about yourself, too!
- Your name, address and phone number, along with the title of your work, must be clearly marked on the back of each entry, and a disk copy of each piece must also be included.
- Entries must be mailed to THE RAINBOW before March 31, 1989, or brought to the RAINBOWfest registration booth by 10 a.m., Saturday, April 15th.
- All entries to CoCo Gallery Live become the property of Falsoft, Inc., all rights are reserved.

There will be two categories: one for graphics produced on the CoCo 1 and 2, and one for CoCo 3 graphics. Several awards will be made in each category. Winners will be determined by votes from RAINBOWfest attendees. In case of any ties, winners will be determined by our chief judge, CoCo Cat.

Prizes and ribbons will be presented Sunday, April 16, 1989, and winning entries will be published in the August '89 issue of THE RAINBOW. Send your entry to "CoCo Gallery Live," THE RAINBOW, 9509 U.S. Highway 42, Prospect, KY 40059.

RAINBOW
FEST
CHICAGO
April 14-16

RAINBOWfest is the only computer show dedicated exclusively to your Tandy Color Computer.

Nowhere else will you see as many CoCo-related products or be able to attend free seminars conducted by the top Color Computer experts. It's like receiving the latest issue of THE RAINBOW in your mailbox!

RAINBOWfest is a **great opportunity** for commercial programmers **to show off new and innovative products for the first time. Chicago is the show** to get information on capabilities for the CoCo, along with a terrific selection of the latest CoCo software. In exhibit after exhibit, there will be demonstrations, opportunities to experiment with software and hardware, and special RAINBOWfest prices.

Set your own pace between visiting exhibits and attending the valuable, free seminars on all aspects of your CoCo — from improving BASIC skills to working with the sophisticated OS-9 operating system.

Many people who write for THE RAINBOW — as well as those who are written about — are there to meet you and answer questions. You'll also meet lots of other people who share your interest in the Color Computer. It's a person-to-person event and a tremendous learning experience in a fun and relaxed atmosphere.

A special feature of RAINBOWfest is the **CoCo Gallery Live Showcase**, where CoCo artists enter their own graphics creations for display at the show. Cash prizes are presented and winning entries are decided by votes from RAINBOWfest attendees. *(See the previous page for more details.)* As an additional treat for CoCo Kids of all ages, we've invited frisky feline CoCo Cat to join us for the show. RAINBOWfest has something for everyone in the family!

If you missed the fun at our last RAINBOWfest in Princeton, why don't you make plans now to join us in Chicago? For members of the family who don't share your affinity for CoCo, there are many other attractions in the Chicago area.

The Hyatt Regency Woodfield — Schaumburg, Illinois offers special rates for RAINBOWfest. **The show opens Friday evening** with a session from 7 p.m. to 10 p.m. It's a daytime show Saturday — the CoCo Community Breakfast (separate tickets required) is at 8 a.m., then the exhibit hall opens promptly at 10 a.m. and runs until 6 p.m. On Sunday, the exhibit hall opens at 11 a.m. and closes at 3 p.m.

Tickets for RAINBOWfest may be obtained directly from THE RAINBOW. We'll also send you a reservation form so you can get a special room rate.

The POSH way to go. You can have your travel arrangements and hotel reservations handled through RAINBOW affiliate, POSH Travel Assistance, Inc., of Louisville. For the same POSH treatment many of our exhibitors enjoy, call POSH at (502) 893-3311. All POSH services are available at no charge to RAINBOWfest attendees.

BE THERE!

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COCO COMMUNITY BREAKFAST

Rick Adams — Software Developer

Our keynote speaker for the traditional CoCo Community Breakfast is Rick Adams, who is the founder of Color Central Software and the author of programs like *DELPHIterm*, Tandy's *Temple of ROM* and Activision's CoCo 3 version of *Shanghai*.

Mr. Adams will describe his life as a programmer on the "front lines" of the ongoing efforts to program software for the CoCo 3, including humorous "war stories" from some of his software developments.

Don't forget . . .

If yours is one of the first 500 ticket orders, a coupon for a complimentary issue of The Second RAINBOW book of Simulations will be enclosed with your tickets — if yours is one of the first five orders received from your state, a coupon for a complimentary RAINBOWfest T-shirt will be enclosed with your tickets. So hurry up and place your order to take advantage of this offer.

RAINBOWfest - Chicago, Illinois
Dates: April 14-16, 1989
Hotel: Hyatt Regency Woodfield
Rooms: $66 per night, single or double
Advance Ticket Deadline: March 31, 1989

Join us at a future RAINBOWfest!

RAINBOWfest - Somerset, New Jersey
Dates: October 20-22, 1989
Hotel: The Somerset Hilton
Rooms: Single, $65 per night; Double, $75 per night
Advance Ticket Deadline: October 6, 1989

FREE T-Shirt to first five ticket orders received from each state.

First 500 ticket orders received get *The Rainbow Book of Simulations.*

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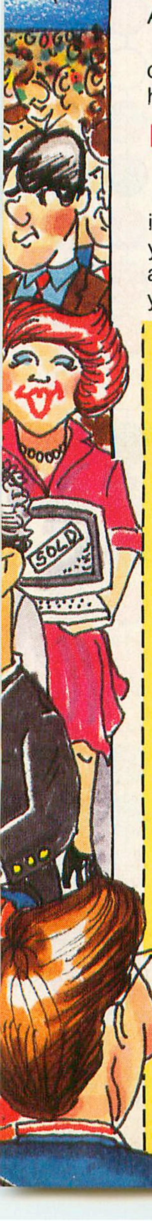
Advance ticket deadline: March 31, 1989. Orders received less than two weeks prior to show opening will be held for you at the door. Tickets will also be available at the door at a slightly higher price. Tickets will be mailed six weeks prior to show. Children 4 and under, free; over 4, full price.

Make checks payable to: The RAINBOW. Mail to: RAINBOWfest, The Falsoft Building, 9509 U.S. Highway 42, P.O. Box 385, Prospect, KY 40059. To make reservations by phone, in Kentucky call (502) 228-4492, or outside Kentucky call (800) 847-0309.



Surround your favorite program with this bright border

A Moving Rainbow Border

By Marc Gagnon

Are your programs looking a little dull? Do they lack the visual impact you think they deserve? Help is on the way. This little number is designed to spruce up that intellectually stimulating — but visually barren — program. *CoCo Tour* will help you brighten your programs by adding a flashing, multicolored border.

This machine language routine, used with a BASIC program, outlines the screen with a moving rainbow border. Although the program will run on a CoCo 1, 2 or 3, the CoCos 1 and 2 allow only a 32-column screen. CoCo 3, on the other hand, offers a 32-, 40- or 80-column screen. The program will adjust itself to run on the various screen widths.

First, type in and save Listing 1 containing data statements. Now, run the program. After this program is finished poking in the necessary machine language routine, it will prompt you for saving the routine to tape or disk.

The default address, &HE00, is written in a position-independent code. If you want to load it at a different address, just use the appropriate offset. Before using the program, define the entry address. Unless you use an offset, type `DEFUSR=&HE00`.

In this program, the format is `A=USR(`*xx*`),`*yy*, where A is the ASCII code returned by the function, *xx* is the speed and *yy* is the direction. If the speed is zero, the function will not wait for a key. It will flash onto the screen one time and then return to BASIC. If the speed is not zero, the function will determine the *turning speed*, and the screen will turn until you press a key. The direction of the turn, *yy*, can be 0 (turn left), 1 (turn right) or 2 (do not turn).

The format may be used in the following manner:

`A=USR(100),1`	Turns the screen to the right until you press a key.
`A=USR(1),1`	Turns in the same manner, but faster.
`A=USR(100),0`	Turns the screen to the left until you press a key.

Marc Gagnon, a university student, is a self-taught programmer, who enjoys assembly language programming.

`A=USR(0),2` Draws a border without turning and returns.

Notice that `10 A=USR(1),1` has the same effect as the following:

```
10 A=USR(0),1
20 IF A=0 THEN 10
```

The *xx* and *yy* do not need to be constants. Use variables to create special effects. If you would like to center a line at a specified point, there is a built-in function to create this effect.

The format used to print a line is `AA$=USR` and `("xx string-to-print")`, where `A$` is a dummy variable (not used) and *xx* is present as the vertical coordinate. If this coordinate is outside the sreen (i.e., if *xx* is greater than 15 on a 32-column screen, or greater than 23 on a 40- or 80-column screen), the string will be printed on the last available line (i.e., 15 or 23). If *xx* is not present, the line will be printed at the last position used. (See the demo program). *String-to-print* is the line you want to print. If this variable is not present, this function will only set the new position. (Note: Leading spaces of the string are skipped. If you want to use a number for the first character of the string, begin the string with a space (i.e., to print "`10 Hi!`," use `A$=USR(" 10 Hi!")`).

Some examples of use are as follows:

`A$=USR("10 SALUT LES AMIS")` prints "SALUT LES AMIS" at Line 10.

`A$=USR("10   SALUT LES AMIS")` does the same thing.

`A$=USR("9")` causes Line 9 to be used in the next call unless another coordinate is specified.

`A$=USR("SALUT")` prints "SALUT" on the current line.

`A$=USR(" ")` is not an error; nothing will happen.

More examples are included in the program, *CoCo Tour Demo.*

(Questions or comments about these programs may be directed to the author at 1105 Thibeau, Cap-de-la-Madeleine, Quebec, Canada G8T 7 B3. Please enclose an SASE when requesting a reply.) ☐

170	81
250	69
290	113
340	196
END	251

Listing 1: COCOTOUR

```
0 'COPYRIGHT 1989  FALSOFT, INC
10 '****************************
20 '*         COCOTOUR         *
30 '*      by marc gagnon      *
40 '****************************
50 PCLEAR1
60 DK= PEEK(&HBA)=14
70 CLS:PRINTSTRING$(32,175);"COC
OTOUR - BY MARC GAGNON";CHR$(13)
;"COPYRIGHT (C) JUNE 1987";CHR$(
13);STRING$(32,175)
80 PRINT"THERE ARE  17 LINES, WA
IT!"
90 AD=&HE00
100 PRINT"READING FROM LINE: ";:
PO=PEEK(136)*256+PEEK(137)-1024
110 FOR T=1 TO  17
120 CS=0:READ CK,NU:PRINT@PO,PEE
K(49)*256+PEEK(50);
130 FOR Y=1 TO NU: READ A$:POKE
AD,VAL("&H"+A$):CS=CS+VAL("&H"+A
$):AD=AD+1:NEXT Y
140 IF CS<>CK THEN PRINT" ERROR!
":END ELSE NEXT T
150 PRINT:PRINT:PRINT"START : &H
E00  DECIMAL:  3584"
160 PRINT"END    : &H1224  DECIMA
L:  4644"
170 IF DK THEN PRINT"READY DISK
IN DRIVE 0" ELSE PRINT"READY CAS
SETTE"
180 INPUT"PRESS ENTER";A
190 IF DK THEN SAVEM"COCOTOUR",&
HE00,&H1224,&HE00:GOTO 210
200 CSAVEM"COCOTOUR",&HE00,&H122
4,&HE00
210 CLS:PRINT"COCOTOUR IS READY
TO BE USED":END
220 DATA 5889,64,4D,10,2B,1,15,B
D,B3,ED,6F,8D,2,3B,10,83,0,0,26,
6,86,FF,A7,8D,2,2F,ED,8D,2,26,17
,0,F0,96,E7,C6,19,3D,30,8D,3,3F,
30,8B,34,10,BD,B2,6D,BD,B7,B,35,
10,5D,27,7,C1,2,27,7,30,88,4B,C6
,FF
230 DATA 6368,64,20,1,5F,E7,8D,2
,1,AF,8D,1,F9,96,E7,27,10,17,0,A
F,81,2,27,3,5F,20,2,C6,FF,E7,8D,
1,E7,10,AE,8D,1,E0,AE,20,E6,8D,1
,D6,D,E7,27,E,86,20,ED,0,6D,8D,1
,D0,27,6,ED,2,20,2,E7,0,6D,8D
240 DATA 5546,64,1,C5,26,9,EC,8D
,1,BA,83,0,1,26,FB,8D,5C,AC,22,2
7,8,1F,10,E3,24,1F,1,20,CB,34,36
,D,E7,27,2,8D,66,AD,9F,A0,0,26,2
E,D,E7,27,2,8D,52,35,36,31,26,6D
,20,26,AD,A6,8D,1,86,A7,8D,1,81,
6D
250 DATA 6268,64,8D,1,85,27,A,8D
,24,A6,8D,1,75,A7,8D,1,72,6D,8D,
1,74,26,A,20,88,35,70,5F,1E,89,7
E,B4,F4,D,E7,27,2,8D,24,AD,9F,A0
,0,20,EE,E6,8D,1,51,D,E7,27,8,C4
,7,5C,E7,8D,1,46,39,CB,10,CA,8F,
20
```

```
260 DATA 6691,64,F5,1A,50,C6,36,
F7,FF,A4,39,C6,3C,F7,FF,A4,39,B6
,E2,BD,81,32,26,1,39,F,E7,39,8D,
F3,AE,2,5D,10,27,0,F4,E7,8D,1,23
,A6,84,17,1,6,26,39,6A,8D,1,18,3
0,1,80,30,A7,8D,1,12,A6,84,17,0,
F3,26
270 DATA 5693,64,26,6A,8D,1,5,30
,1,80,30,34,2,A6,8D,0,FD,C6,A,3D
,EB,E0,D,E7,27,4,C1,17,20,2,C1,F
,23,3,5A,20,F1,E7,8D,0,E5,6D,8D,
0,DF,10,27,0,A8,86,20,A1,84,26,8
,6A,8D,0,D1,30,1,20,EA,34,10,30
280 DATA 8569,64,8D,1,E1,96,E7,E
6,86,E0,8D,0,BF,54,E7,8D,0,BB,96
,E7,27,3E,4F,E6,8D,0,B2,BD,B4,F4
,BD,BD,D9,8E,3,DA,31,8D,0,A9,17,
0,82,86,2C,A7,3F,10,AF,8D,0,9B,4
F,E6,8D,0,95,BD,B4,F4,BD,BD,D9,8
E,3,DA
290 DATA 6285,64,10,AE,8D,0,88,8
D,64,31,8D,0,84,CE,F8,D2,8D,48,2
0,21,A6,8D,0,76,C6,20,3D,8E,4,0,
30,8B,E6,8D,0,69,3A,8C,4,0,10,25
,A4,60,8C,5,FF,10,22,A4,59,9F,88
,35,10,31,8D,0,6B,E6,8D,0,4D,A6,
80,A7
300 DATA 6497,64,A0,5A,26,F9,86,
22,A7,A0,86,3B,A7,A0,6F,20,31,8D
,0,51,CE,B8,F7,20,1,39,9E,A6,34,
10,31,3F,10,9F,A6,9D,9F,AD,40,35
,10,9F,A6,E,A5,A6,80,A7,A0,26,FA
,39,81,30,25,7,81,39,22,3,1A,4,3
9,1C,FB,39
310 DATA 7942,64,FF,FF,0,0,0,0,F
F,FF,FF,3,0,0,0,0,FF,FF,FF,FF,0,
0,0,0,FF,FF,FF,FF,0,0,0,0,FF,FF,
FF,FF,0,22,0,0,FF,FF,FF,FF,0,0,0
,0,FF,FF,FF,FF,0,0,0,0,FF,FF,FF,
FF,0,0,0,0,FF,FF
320 DATA 8160,64,FF,FF,0,0,0,0,F
F,FF,FF,FF,0,0,0,0,FF,FF,FF,FF,0
,0,0,0,FF,FF,FF,FF,0,0,0,0,FF,FF
,FF,FF,0,0,0,0,FF,FF,FF,FF,0,0,0
,0,FF,FF,FF,FF,0,0,0,0,FF,FF,FF,
FF,0,0,0,0,FF,FF
330 DATA 8160,64,FF,FF,0,0,0,0,F
F,FF,FF,FF,0,0,0,0,FF,FF,FF,FF,0
,0,0,0,FF,FF,FF,FF,0,0,0,0,FF,FF
,FF,FF,0,0,0,0,FF,FF,FF,FF,0,0,0
,0,FF,FF,FF,FF,0,0,0,0,FF,FF,FF,
FF,0,0,0,0,FF,FF
340 DATA 8160,64,FF,FF,0,0,0,0,F
F,FF,FF,FF,0,0,0,0,FF,FF,FF,FF,0
,0,0,0,FF,FF,FF,FF,0,0,0,0,FF,FF
,FF,FF,0,0,0,0,FF,FF,FF,FF,0,0,0
,0,FF,FF,FF,FF,0,0,0,0,FF,FF,FF,
FF,0,0,0,0,FF,FF
350 DATA 6851,64,FF,FF,0,0,0,0,F
F,FF,FF,FF,0,0,0,0,FF,FF,FF,FF,0
,0,0,0,FF,FF,FF,FF,0,0,0,0,FF,FF
,FF,FF,0,0,20,28,50,4,0,4,1F,0,1
,4,3F,5,FF,0,20,5,FE,5,E0,FF,FF,
5,C0,4,20,FF,E0,0
360 DATA 7161,64,80,0,80,4E,0,2,
80,9E,87,7E,0,50,87,7C,87,30,FF,
FE,86,E0,80,50,FF,B0,0,80,0,80,9
C,0,4,81,3C,8E,FC,0,A0,8E,F8,8E,
60,FF,FC,8D,C0,80,A0,FF,60,0,4,0
,5,E0,0,20,5,E1,5,FF,0,1,5,DF
370 DATA 6743,64,4,1F,FF,E0,4,1E
,4,1,FF,FF,0,80,0,87,30,0,50,87,
32,87,7E,0,2,87,2E,80,4E,FF,B0,8
0,4C,80,2,FF,FE,0,80,0,8E,60,0,A
0,8E,64,8E,FC,0,4,8E,5C,80,9C,FF
,60,80,98,80,4,FF,FC,0,43,4F,50
380 DATA 2268,36,59,52,49,47,48,
54,20,28,43,29,20,4A,55,4E,45,20
,31,39,38,37,20,42,59,20,4D,41,5
2,43,20,47,41,47,4E,4F,4E,2E
```

280	159	1340	81
520	54	1560	22
730	175	1760	65
930	253	END	82
1140	14		

Listing 2: CCTDEMO

```
0 'COPYRIGHT 1989  FALSOFT, INC
10 '****************************
20 '*  COCOTOUR DEMO PROGRAM  *
30 '*     BY MARC GAGNON      *
40 '* COPYRIGHT (C) JUNE 1987 *
50 '****************************
60 '
70 '
80 ' load & define
90 PCLEAR1
100 'USE CLOADM WITH TAPE
110 LOADM"COCOTOUR"
120 POKE&HFF40,0:'FOR DISK ONLY
130 DEFUSR=&HE00
140 'IF COCO3 C3=-1 ELSE C3=0
150 C3=(PEEK(&HE2BD)=ASC("2"))
160 '
170 SA$=STRING$(30,"*")
180 GOTO 520:'PRESENTATION
190 '
200 ' subroutines
210 '
220 '
230 IF NOT C3 OR PEEK(&HE7)=0 TH
EN A$=USR("14") ELSE A$=USR("22"
)
240 A$=USR("PRESS ANY KEY")
```

```
250 RETURN
260 '
270 '
280 CLS
290 A$=USR("01 LET'S TURN !")
300 RETURN
310 '
320 '
330 GOSUB 280:'MESSAGE
340 A$=USR("05 TO TURN RIGHT SLO
WLY USE :")
350 A$=USR("07 A=USR(200),1")
360 GOSUB230:'WAITKEY
370 A=USR(200),1
380 GOSUB 280:'MESSAGE
390 A$=USR("05 TO TURN LEFT FAST
ER USE :")
400 A$=USR("07 A=USR(50),0")
410 GOSUB 230:'WAITKEY
420 A=USR(50),0
430 GOSUB280:'MESSAGE
440 A$=USR("05 IF YOU DO NOT WAN
T THE")
450 A$=USR("07 SCREEN TO TURN US
E :")
460 A$=USR("10 A=USR(60),2")
470 GOSUB 230:'WAITKEY
480 A=USR(60),2
490 RETURN
500 '
510 ' presentation
520 IF C3 THEN WIDTH40:CLS5 ELSE
 CLS
530 A$=USR("5"+SA$)
540 A$=USR("7"+SA$)
550 A$=USR("6 COCOTOUR - BY MARC
 GAGNON")
560 A$=USR("10 A RAINBOW SCREEN
FOR YOUR")
570 A$=USR("12 COCO 1,2 OR 3")
580 GOSUB 230:'WAITKEY
590 A=USR(100),1
600 '
610 'features
620 CLS
630 A$=USR("01 WHAT TO DO WITH C
OCOTOUR ?")
640 A$=USR("03 YOU CAN MAKE YOUR
 SCREEN")
650 A$=USR("04 TURN IN ANY MODE
32,40 OR 80")
660 A$=USR("05 YOU SPECIFY TO TU
RN LEFT")
670 A$=USR("06 OR RIGHT...")
680 A$=USR("07 YOU ALSO CHOOSE T
HE SPEED.")
690 A$=USR("09 AND MORE : A BUIL
D IN")
```

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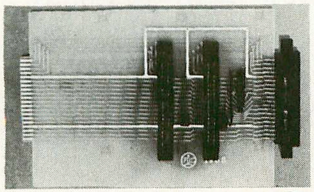

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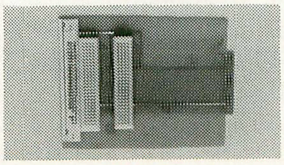

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```
700 A$=USR("10 FUNCTION TO CENTE
R STRINGS")
710 A$=USR("11 AT A SPECIFIED Y
COORDINATE")
720 A$=USR("13 I WISH YOU'LL LIK
E IT !")
730 GOSUB 230:'WAITKEY
740 A=USR(100),0
750 '
760 'demo
770 IF C3 THEN WIDTH 32
780 GOSUB 330
790 IF C3 THEN WIDTH40:GOSUB 330
:WIDTH80:CLS5:GOSUB 330:WIDTH40
800 '
810 '
820 CLS
830 A$=USR("01 IF YOU DO NOT WAN
T COCOTOUR")
840 A$=USR("02 TO WAIT FOR A KEY
, USE")
850 A$=USR("03 A SPEED OF 0")
860 A$=USR("05 EXAMPLE :")
870 A$=USR("07 A=USR(0),X")
880 A$=USR("09 WHERE X=0,1 OR 2"
)
890 A$=USR("10 REMEMBER :")
900 A$=USR("11 X = 0 TO TURN LEF
T")
910 A$=USR("12 X = 1 TO TURN RIG
HT")
920 A$=USR("13 X = 2 TO HAVE FRE
EZE EFFECT")
930 GOSUB 230:'WAITKEY
940 A=USR(100),1
950 '
960 'LEFT ARGUMENT
970 CLS
980 A$=USR("01 WHEN YOU CALL COC
OTOUR IT")
990 A$=USR("02 MAKES YOUR SCREEN
 TURN UNTIL")
1000 A$=USR("03 YOU PRESS A KEY.
")
1010 A$=USR("04 THEN, IT RETURNS
 TO BASIC")
1020 A$=USR("05 A=USR(100),1")
1030 A$=USR("10 THIS WILL TURN T
HE SCREEN TO")
1040 A$=USR("11 RIGHT UNTIL YOU
PRESS A KEY")
1050 A$=USR("12 THEN, A=ASCII CO
DE OF THE KEY")
1060 GOSUB 230:'WAIT KEY
1070 A=USR(100),1
1080 '
1090 'EXAMPLE
1100 CLS
1110 A$=USR("03 I WILL CALL COCO
TOUR AND WHEN")
1120 A$=USR("05 I'LL COME BACK,
I WILL TELL")
1130 A$=USR("07 WHICH KEY YOU HA
VE PRESSED.")
1140 GOSUB 230:'WAIT KEY
1150 A=USR(100),0
1160 A$=USR("09 YOU HAVE PRESSED
 : "+CHR$(A))
1170 GOSUB230:'WAIT KEY
1180 A$=USR("                   ")
1190 A$=USR("10 DO YOU WANT TO T
RY IT AGAIN ?")
1200 A$=USR("11 (Y/N)")
1210 A$=INKEY$:IFA$=""THEN1210
1220 IFA$<>"Y"ANDA$<>"N"THEN1210
1230 IFA$="Y"THEN1100
1240 '
1250 'present string
1260 CLS
1270 A$=USR("01 YOU MAY HAVE NOT
ICE THAT")
1280 A$=USR("02 ALL LINES ARE PR
INTED ON SCREEN")
1290 A$=USR("03 IN EITHER SCREEN
 MODE")
1300 A$=USR("05 IF YOU LOOK AT T
HE LISTING")
1310 A$=USR("06 YOU WILL SEE THA
T THE GENERAL")
1320 A$=USR("07 FORMAT TO PRINT
A LINE IS :")
1330 A$=USR("09 A$=USR('XX STRIN
G-TO-PRINT')")
1340 A$=USR("10 WHERE XX IS AN O
PTIONAL NUMBER")
1350 A$=USR("11 'XX' CAN BE BETW
EEN 0-15 FOR")
1360 A$=USR("12 A 32 COL. SCREEN
 OR 0-23 FOR")
1370 A$=USR("13 A 40 OR 80 COL.
SCREEN")
1380 GOSUB 230:'WAITKEY
1390 A=USR(100),1
1400 '
1410 'CONTINUE STRINGS
1420 CLS
1430 A$=USR("01 IF 'XX' IS OMITT
ED, THE STRING")
1440 A$=USR("02 WILL BE PRINTED
ON THE SAME")
1450 A$=USR("03 LINE; THIS IS SO
METIME USEFULL:")
1460 A=USR(0),2:'PUT A BORDER
1470 A$=USR("05"):'SET LINE
1480 A$=INKEY$:'CLEAR KEY
1490 A$=USR("PRESS A KEY")
1500 FOR T=1 TO 100:NEXT T
1510 A$=USR("press a key")
1520 FOR T=1 TO 100
1530 IF INKEY$<>"" THEN 1550
1540 NEXT T:GOTO 1490
1550 A$=USR("07 SEE BETWEEN LINE
S 1490-1550")
1560 A$=USR("08 TO SEE WHAT HAS
JUST HAPPENED")
1570 A$=USR("10 IF THE NUMBER IS
 OUTSIDE THE")
1580 A$=USR("11 SCREEN, THE STRI
NG WILL BE")
1590 A$=USR("12 PRINTED ON THE L
AST LINE")
1600 A$=USR("13 SO IT WILL BE EI
THER 15 OR 23")
1610 GOSUB 230:'WAITKEY
1620 A=USR(60),0
1630 '
1640 CLS
1650 A$=USR("01 ONE LAST THING A
BOUT STRINGS:")
1660 A$=USR("03 LEADING SPACES A
RE SKIPPED")
1670 GOSUB230:'WAIT KEY
1680 A=USR(1),2
1690 '
1700 '
1710 'now, the trick
1720 CLS
1730 A$=USR("02 NOW TAKE A LOOK
AT THIS")
1740 A$=USR("04 SPECIAL EFFECT")
1750 A$=USR("08 THAT IS 'PAS MAL
' AS WE SAY!")
1760 GOSUB 230:'WAITKEY
1770 FOR T=1 TO 8:A=USR(0),1
1780 IF A<>0 THEN 1860
1790 FOR Y=1 TO 10:NEXT Y
1800 NEXT T
1810 FOR T=1 TO 8:A=USR(0),0
1820 IF A<>0 THEN 1860
1830 FOR Y=1 TO 10:NEXT Y
1840 NEXT T
1850 GOTO 1770
1860 A$=USR("12 THIS WAS IN LINE
S 1770-1850")
1870 GOSUB 230:'WAITKEY
1880 A=USR(90),0
1890 '
1900 'conclusion
1910 CLS
1920 A$=USR("03 OTHER APPLICATIO
NS")
1930 A$=USR("05 IS UP TO YOU !")
1940 A$=USR("09 HAVE FUN")
1950 A$=USR("08 **********")
1960 A$=USR("10 **********")
1970 GOSUB 230:'WAITKEY
1980 A=USR(100),1
1990 CLS
2000 END
```

FILE TRANSFER UTILITIES

XXX: Reviews - December Rainbow   Dale Puckett - November Rainbow. XXX

The GCS File Transfer Utilities provide a simple and quick method to transfer text and binary files from and to a variety of floppy disk formats.

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PCDIR	directory of PC disk	RSDIR	directory of RSDOS disk
PCDUMP	display PC disk sector	RSDUMP	display RSDOS disk sector
PCREAD	read file from PC disk	RSREAD	read file from RSDOS disk
PCWRITE	write file to PC disk	RSWRITE	write file to RSDOS disk
PCRENAME	rename PC file	FLEXDIR	directory of FLEX disk
PCDELETE	delete PC file	FLEXDUMP	display FLEX disk sector
PCFORMAT	format PC disk	FLEXREAD	read FLEX file
		FLEXWRITE	write file to FLEX disk

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Requires OS-9. 2 drives (one can be hard or ramdisk). Multi-Vue for Multi-Vue version. SDISK (SDISK3 for COCO III).

GCS File Transfer Utilities for CoCo - Multi-Vue version $54.95
- Standard version $44.95

SDISK or SDISK 3 $29.95

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Measuring those gut feelings

Decisions, Decisions

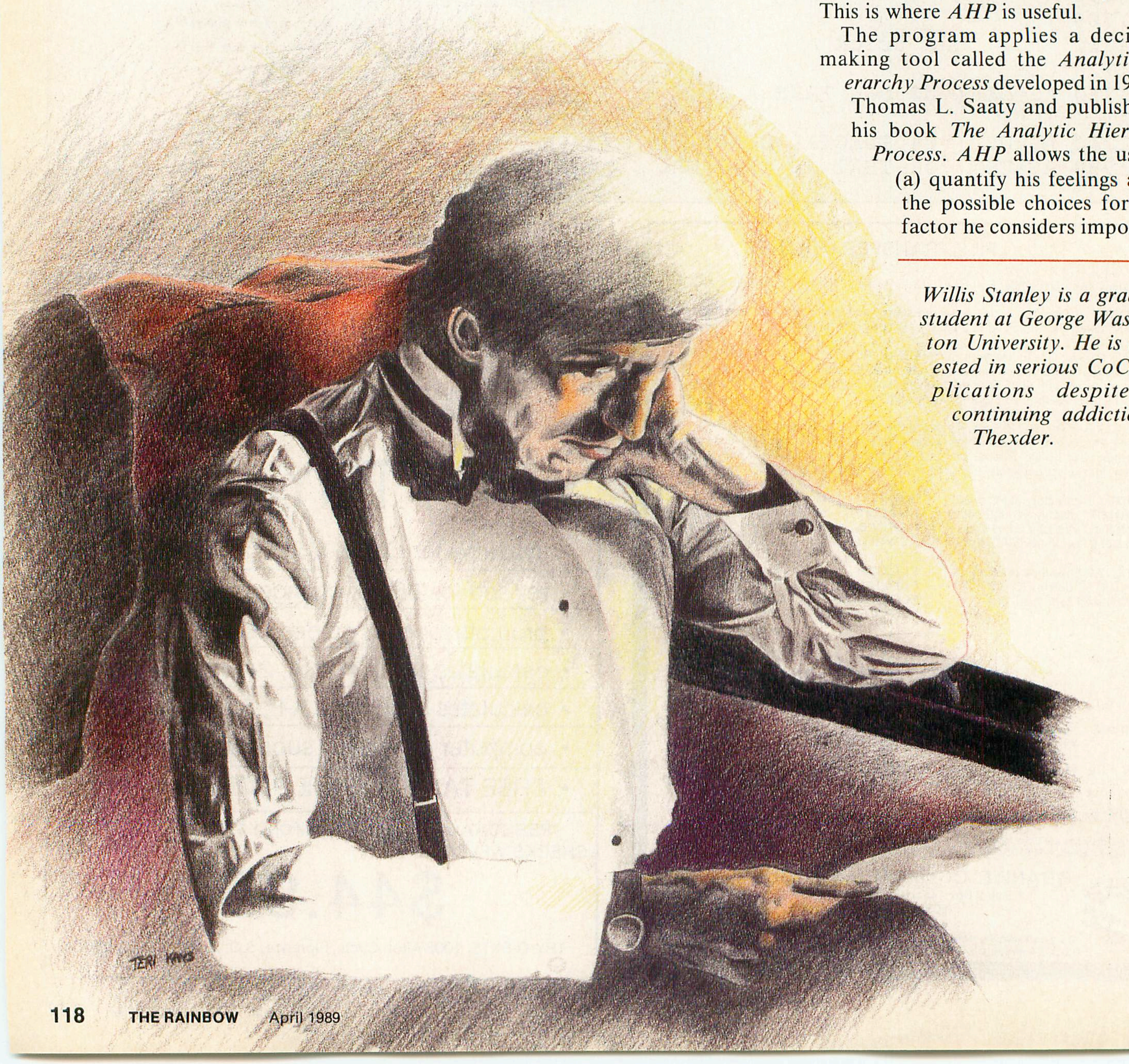
By Willis Stanley

Whether you are a small-business person looking for the right spreadsheet to manage your business or a recent college graduate trying to choose the best of several job offers, right decisions often require weighing more than a couple of factors. This program, *AHP*, helps you with multifactor decisions.

Take for example the case of a budding writer thinking of buying a word processor for that shiny new Color Computer. Besides cost, there are several features of a word processor to consider — memory buffers, printer compatibility and so forth. [See "Deciding What's Write For You," Page 26, for an in-depth look at comparing word processors.] Which factors are most important? Which program has more of the factors you consider important? This is where *AHP* is useful.

The program applies a decision-making tool called the *Analytic Hierarchy Process* developed in 1980 by Thomas L. Saaty and published in his book *The Analytic Hierarchy Process*. *AHP* allows the user to (a) quantify his feelings about the possible choices for each factor he considers important;

Willis Stanley is a graduate student at George Washington University. He is interested in serious CoCo applications despite his continuing addiction to Thexder.



(b) make sure his expressions of preference are logically consistent with one another; (c) assign relative measures of importance for each factor under consideration; and (d) produce a mathematical representation of his preference for each of the alternatives in question. The program does this for problems dealing with three to five alternatives and three to five factors of importance. It attempts to provide an expression of the user's preference and is one of many techniques designed for that purpose. For this reason, it is best to think of *AHP* as a tool rather than an oracle. With that in mind, no user should make a decision based solely on the program's recommendation.

Using *AHP*, let's take the word processor example used earlier and walk through the process.

Suppose you have narrowed your choice down to three software packages: *Word 1*, *Word 2*, and *Word 3*. Now load and run *AHP*. First you are asked for the number of alternatives in the problem. Enter 3. Next the program asks for the number of factors in the problem. We identified cost, printer compatibility and memory-buffer size so enter 3 for this also. Now name each alternative and factor. (Short names keep the screen neat, so try to use them whenever possible.)

AHP then asks you several questions comparing your preferences for each alternative in consideration of the factors you listed as important for your decision. For example, "In terms of cost, how does *Word 1* compare to *Word 2* using the scale below?" Using the scale on the screen, ranging from .11 to 9, enter the number most closely corresponding with your feelings. If you strongly prefer *Word 1*'s cost compared to *Word 2*'s cost enter a 6. A strong dislike of *Word 1*'s cost compared with *Word 2*'s cost earns a .166. The program continues asking questions until it has enough information to compare alternatives for that particular fact.

Before continuing, the program checks your answers for consistency by running your responses through a mathematical process, which determines if your answers have a clear correlation to make a meaningful analysis. If there is not a logical relationship, the program prompts you to either reanswer the questions for that factor or end the program and rethink your responses.

An example of inconsistency is rating *Word 1* as extremely preferred over *Word 2*, *Word 2* extremely preferred over *Word 3*, and *Word 3* extremely preferred over *Word 1*. There is no logical relationship between the answers, and any conclusion based on them is faulty. If the relationships are consistent, you proceed to questions for the next factor — in this case, printer compatibility. The process repeats itself until all factors are exhausted.

Once factors are exhausted, you judge the relative importance of each factor. For example, we might rate cost as "slightly preferred" over printer compatibility and as "unquestionably preferred" over memory-buffer size, while printer compatibility is "strongly preferred" over memory-buffer size. These responses are checked for consistency and then factored into a final report, which offers a numerical ranking of the three word processors, with the highest number as the recommended choice.

Although *AHP* was written on a CoCo 3, it should be relatively easy to adapt it for use on older CoCos. Simply delete Line 10 and reformat the information that prints to the screen, keeping in mind your screen width.

The program helps you to understand the mathematics behind the process. But for those interested in application of the technique or program modification (please feel free to do so), I strongly recommend consulting one of many management science textbooks available in most college bookstores and libraries. If you are confident in modifying the program to allow use of a wider range of alternatives and factors, you'll need the following information for the set of *n* values in the `RI=I/n` equation (lines 1190, 2240 and 3280 are examples).

Number of alternatives	Value for *n*
2	.00
3	.58
4	.90
5	1.12
6	1.24
7	1.32
8	1.41

(Questions or comments regarding this program may be directed to the author at 115 D Street, Apt. 103, Washington, DC 20003. Please enclose an SASE when requesting a reply.) ☐

```
70 .......149   2180 .....197
300 ......111   3090 .....174
410 ......222   3230 ......87
1030 .....219   END .....186
2040 .....227
```

Listing 1: `AHP`

```
0 'COPYRIGHT 1989  FALSOFT,INC
1 'AHP.BAS
2 'BY WILLIS STANLEY
3 '23 NOV 1988
4 'USE OF THE ANALYTIC HIERARCHY
PROCESS IN
5 'MULTI-FACTOR DECISION MAKING
(3-5 FACTORS)
10 WIDTH80
20 DIM R$(5),J$(5),P(5),D$(5),N(
25),G(5),AV(5),V(5,5),T(5),S(25)
40 CLS
45 PRINT"THE ALTERNATIVES ARE TH
E DIFFERENT CHOICES YOU COULD MA
KE"
46 PRINT"IN THIS PROBLEM."
47 PRINT
50 INPUT"NUMBER OF ALTERNATIVES
BEING CONSIDERED";C
60 IFC<3 THEN GOTO 50: IF C>5 TH
EN GOTO50
```

```
64 PRINT:PRINT
65 PRINT"THE FACTORS ARE THE THI
NGS YOU THINK ARE IMPORTANT IN J
UDGING WHICH"
66 PRINT"ALTERNATIVE YOU PREFER.
"
67 PRINT
70 INPUT"NUMBER OF FACTORS TO BE
ING CONSIDERED";W
80 IFW<3 THEN GOTO70:IF W>5THEN
GOTO70
90 CLS:FORX=1TOC
100 INPUT"ENTER NAME FOR ALTERNA
TIVE ";R$(X):NEXTX
110 CLS:FORX=1TOW
120 INPUT"ENTER NAME FOR FACTOR
";J$(X):NEXTX
130 FORX=1TOC:D$(X)=R$(X):NEXTX
140 IF H=13 THEN GOTO 530
150 IF F<>1 THEN B=W ELSE B=1
160 IFF=1THENA=W ELSE A=C
170 IFF<>1THEN GOTO 200
180 FOR X=1TOW
190 D$(X)=J$(X):NEXTX
200 CLS
210 FORK=1TOB
220 CF=0
230 Z=0
240 FOR Y=1 TO A
250 FOR X= 1 TO A
260 Z=Z+1
270 IF X<=Y THEN GOTO450
280 IFF=1THENU$="THE FACTORS' RE
LATIVE IMPORTANCE" ELSE U$=J$(K)
290 CLS:PRINT"IN TERMS OF "U$
300 PRINT:PRINT"HOW DOES "D$(Y)"
 COMPARE TO "D$(X) " USING THE S
CALE BELOW?"
310 PRINT:PRINT
320 PRINT"1--EQUAL":PRINT"2--VER
Y SLIGHT PREFERENCE",:PRINT"   .5
--VERY SLIGHT DISLIKE"
330 PRINT"3--SLIGHT PREFERENCE",
:PRINT"          .33--SLIGHT DISLIK
E"
340 PRINT"4--MODERATE PREFERENCE
",:PRINT"        .25--MODERATE DISL
IKE"
350 PRINT"5--DEFINITE PREFERENCE
",:PRINT"        .20--DEFINITE DISL
IKE"
360 PRINT"6--STRONG PREFERENCE",
:PRINT"          .166--STRONG DISLI
KE"
370 PRINT"7--VERY STRONG PREFERE
NCE",:PRINT"   .14--VERY STRONG D
ISLIKE"
380 PRINT"8--EXTREME PREFERENCE"
,:PRINT"         .125--EXTREME DISL
IKE"
390 PRINT"9--UNQUESTIONED PREFER
ENCE",:PRINT" .11--UNQUESTIONED
DISLIKE"
400 PRINT:PRINT:PRINT"ENTER THE
NUMERICAL VALUE THAT REPRESENTS
YOUR PERCEPTION OF"
401 PRINT D$(Y)" WHEN COMPARED W
ITH "D$(X)
410 INPUT"??";N(Z)
420 IF N(Z)>9 THEN GOTO 410
430 IFN(Z)<.1 THEN GOTO 410
440 CLS
450 NEXTX:NEXTY
460 IFA=3 THEN GOSUB1000
470 IFA=4 THEN GOSUB2000
480 IFA=5 THEN GOSUB3000
490 IF CF=1 THEN GOTO 230
500 NEXT K
510 IFF=1THENH=13
520 F=1:GOTO140
530 FORX=1TOC:FORY=1TOW
540 O=V(Y,X)*AV(Y)
550 P(X)=P(X)+O
560 NEXTY:NEXTX
570 CLS:PRINT"TOTAL WEIGHTED EVA
LUATION:":PRINT:PRINT
580 FORX=1TOC
590 PRINTR$(X),:PRINTP(X)
```

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```
600 NEXTX
610 PRINT:PRINT:PRINT"HIGHEST VA
LUE IS RECOMENDED CHOICE"
620 PRINT"OK, YOU'RE BACK IN BAS
IC.":END
1000 'PROCESS FOR 3 ALTERNATIVES
1010 N(1)=1:N(4)=1/N(2):N(5)=1:N
(7)=1/N(3):N(8)=1/N(6):N(9)=1
1020 FORX=1TOA:G(X)=0:NEXTX
1030 FOR X=1 TO A: FOR Y= X TO Z

STEP A
1040 G(X)=G(X)+N(Y):NEXTY:NEXTX
1050 S(1)=N(1)/G(1):S(4)=N(4)/G(
1):S(7)=N(7)/G(1)
1060 S(2)=N(2)/G(2):S(5)=N(5)/G(
2):S(8)=N(8)/G(2)
1070 S(3)=N(3)/G(3):S(6)=N(6)/G(
3):S(9)=N(9)/G(3)
1080 AV(1)=(S(1)+S(2)+S(3))/3
1090 AV(2)=(S(4)+S(5)+S(6))/3
1100 AV(3)=(S(7)+S(8)+S(9))/3
1110 IFF<>1THEN V(K,1)=AV(1)
1120 IFF<>1THEN V(K,2)=AV(2)
1130 IFF<>1THEN V(K,3)=AV(3)
1140 T(1)=((AV(1)*N(1))+(AV(2)*N
(2))+(AV(3)*N(3)))/AV(1)
1150 T(2)=((AV(1)*N(4))+(AV(2)*N
(5))+(AV(3)*N(6)))/AV(2)
1160 T(3)=((AV(1)*N(7))+(AV(2)*N
(8))+(AV(3)*N(9)))/AV(3)
1170 L=(T(1)+T(2)+T(3))/3
1180 I=(L-3)/(3-1)
1190 RI=I/.58
1200 GOSUB4000
1210 RETURN
2000 'PROCESS FOR 4 ALTERNATIVES
2010 N(1)=1:N(5)=1/N(2):N(6)=1:N
(9)=1/N(3):N(10)=1/N(7):N(11)=1
2020 N(13)=1/N(4):N(14)=1/N(8):N
(15)=1/N(12):N(16)=1
2030 FORX=1 TO A:G(X)=0:NEXT X
2040 FOR X=1 TO A:FOR Y=X TO Z S
TEP A
2050 G(X)=G(X)+N(Y):NEXT Y:NEXT
X
2060 S(1)=N(1)/G(1):S(2)=N(2)/G(
2):S(3)=N(3)/G(3):S(4)=N(4)/G(4)
2070 S(5)=N(5)/G(1):S(6)=N(6)/G(
2):S(7)=N(7)/G(3):S(8)=N(8)/G(4)
2080 S(9)=N(9)/G(1):S(10)=N(10)/
G(2):S(11)=N(11)/G(3):S(12)=N(12
)/G(4)
2090 S(13)=N(13)/G(1):S(14)=N(14
)/G(2):S(15)=N(15)/G(3):S(16)=N(
16)/G(4)
2100 AV(1)=(S(1)+S(2)+S(3)+S(4))
/4
2110 AV(2)=(S(5)+S(6)+S(7)+S(8))
/4
2120 AV(3)=(S(9)+S(10)+S(11)+S(1
2))/4
2130 AV(4)=(S(13)+S(14)+S(15)+S(
16))/4
2140 IF F<>1 THEN V(K,1)=AV(1)
2150 IF F<>1 THEN V(K,2)=AV(2)
2160 IF F<>1 THEN V(K,3)=AV(3)
2170 IF F<>1 THEN V(K,4)=AV(4)
2180 T(1)=((AV(1)*N(1))+(AV(2)*N
(2))+(AV(3)*N(3))+(AV(4)*N(4)))/
AV(1)
2190 T(2)=((AV(1)*N(5))+(AV(2)*N
(6))+(AV(3)*N(7))+(AV(4)*N(8)))/
```

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PLEASE CIRCLE

TAPE or DISK

```
AV(2)
2200 T(3)=((AV(1)*N(9))+(AV(2)*N
(10))+(AV(3)*N(11))+(AV(4)*N(12)
))/AV(3)
2210 T(4)=((AV(1)*N(13))+(AV(2)*
N(14))+(AV(3)*N(15))+(AV(4)*N(16
)))/AV(4)
2220 L=(T(1)+T(2)+T(3)+T(4))/4
2230 I=(L-4)/(4-1)
2240 RI=I/.9
2250 GOSUB 4000
2260 RETURN
3000 'PROCESS FOR 5 ALTERNATIVES
3010 N(1)=1:N(6)=1/N(2):N(7)=1:N
(11)=1/N(3):N(12)=1/N(8):N(13)=1
3020 N(16)=1/N(4):N(17)=1/N(9):N
(18)=1/N(14):N(19)=1
3030 N(21)=1/N(5):N(22)=1/N(10):
N(23)=1/N(15):N(24)=1/N(20):N(25
)=1
3040 FORX=1 TO A:G(X)=0:NEXTX
3050 FORX=1 TO A:FORY=X TO Z STE
P A
3060 G(X)=G(X)+N(Y):NEXTY:NEXTX
3070 S(1)=N(1)/G(1):S(2)=N(2)/G(
2):S(3)=N(3)/G(3):S(4)=N(4)/G(4)
:S(5)=N(5)/G(5)
3080 S(6)=N(6)/G(1):S(7)=N(7)/G(
2):S(8)=N(8)/G(3):S(9)=N(9)/G(4)
:S(10)=N(10)/G(5)
3090 S(11)=N(11)/G(1):S(12)=N(12
)/G(2):S(13)=N(13)/G(3):S(14)=N(
14)/G(4):S(15)=N(15)/G(5)
3100 S(16)=N(16)/G(1):S(17)=N(17
)/G(2):S(18)=N(18)/G(3):S(19)=N(
19)/G(4):S(20)=N(20)/G(5)
3110 S(21)=N(21)/G(1):S(22)=N(22
)/G(2):S(23)=N(23)/G(3):S(24)=N(
24)/G(4):S(25)=N(25)/G(5)
3120 AV(1)=(S(1)+S(2)+S(3)+S(4)+
S(5))/5
3130 AV(2)=(S(6)+S(7)+S(8)+S(9)+
S(10))/5
3140 AV(3)=(S(11)+S(12)+S(13)+S(
14)+S(15))/5
3150 AV(4)=(S(16)+S(17)+S(18)+S(
19)+S(20))/5
3160 AV(5)=(S(21)+S(22)+S(23)+S(
24)+S(25))/5
3170 IFF<>1 THEN V(K,1)=AV(1)
3180 IFF<>1 THEN V(K,2)=AV(2)
3190 IF F<>1 THEN V(K,3)=AV(3)
3200 IFF<>1 THEN V(K,4)=AV(4)
3210 IFF<>1 THEN V(K,5)=AV(5)
3220 T(1)=((AV(1)*N(1))+(AV(2)*N
(2))+(AV(3)*N(3))+(AV(4)*N(4))+(
AV(5)*N(5)))/AV(1)
3230 T(2)=((AV(1)*N(6))+(AV(2)*N
(7))+(AV(3)*N(8))+(AV(4)*N(9))+(
AV(5)*N(10)))/AV(2)
3240 T(3)=((AV(1)*N(11))+(AV(2)*
N(12))+(AV(3)*N(13))+(AV(4)*N(14
))+(AV(5)*N(15)))/AV(3)
3250 T(4)=((AV(1)*N(16))+(AV(2)*
N(17))+(AV(3)*N(18))+(AV(4)*N(19
))+(AV(5)*N(20)))/AV(4)
3260 T(5)=((AV(1)*N(21))+(AV(2)*
N(22))+(AV(3)*N(23))+(AV(4)*N(24
))+(AV(5)*N(25)))/AV(5)
3265 L=(T(1)+T(2)+T(3)+T(4)+T(5)
)/5
3270 I=(L-5)/(5-1)
3280 RI=I/1.12
3290 GOSUB4000
3300 RETURN
4000 IFRI<.1 THEN CF=0:IFRI<.1 T
HEN GOTO 4090
4010 SOUND45,3:SOUND2,8:PRINT"YO
UR ANSWERS ARE NOT CONSISTENT!!!
":CF=1
4020 PRINT"HERE IS ANOTHER CHANC
E TO EXPRESS YOUR PREFERENCE."
4030 PRINT"PERHAPS YOU SHOULD EN
D THE PROGRAM AND RETHINK YOUR V
IEWS ABOUT"
4040 PRINTU$:PRINT"CHOOSE <Y> TO
 CONTINUE <N> TO ABORT PROGRAM"
4050 P$=INKEY$:IFP$=""GOTO4050
4060 IFP$="N"THENGOTO620
4070 IFP$="Y"THENGOTO4090
4080 PRINT"??? TRY AGAIN ???":GO
TO4050
4090 RETURN
```

Two-Liner Contest Winner . . .

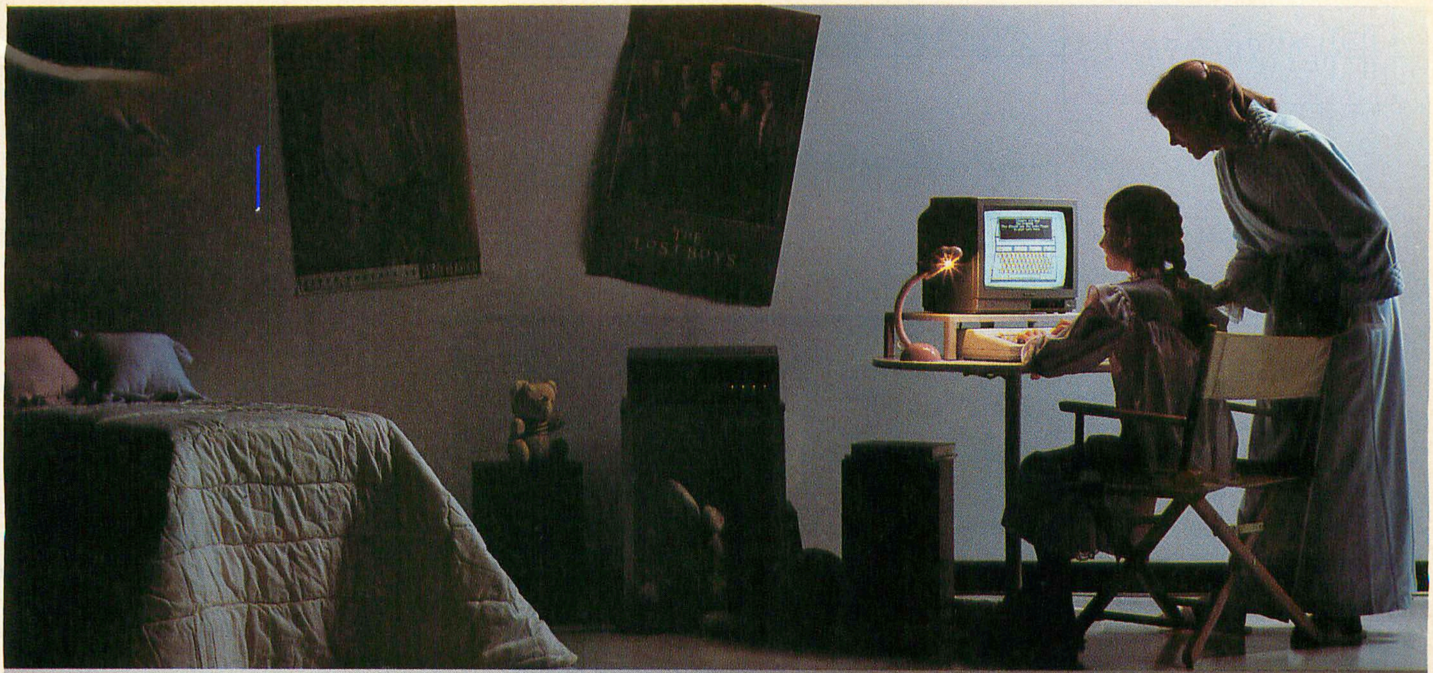
This shortie prints a screen PRINT@ work sheet like the one on Page 176 of Radio Shack's BASIC manual. Just type in and run, and two tables will be printed on 8½-by-11 inch paper.

The listing:

```
1 CLS:P=PEEK(65314)AND1:IF P>0 T
HENPRINT@201,"printer offline":G
OTO1 ELSEPRINT@199,"PRINTING 2 T
ABLES":FORX=1TO33:P$=P$+" +":NEX
TX:FORZ=1TO2:PRINT#-2,STRING$(7,
13);"        ";:FORX=1TO3:PRINT#-
2,STRING$(17," ");X;:NEXTX
2 PRINT#-2,CHR$(13);"        ";:FORX
=1TO3:FORY=0TO9:PRINT#-2,STR$(Y)
;:NEXTY,X:PRINT#-2," 0 1":PRINT#
-2,"    ";P$:FORX=0TO480 STEP32:P
RINT#-2,USING"###";X;:PRINT#-2,P
$:NEXTX,Z
```

Sam Mony
Kalamazoo, MI

(For this winning two-liner contest entry, the author has been sent copies of both *The Third Rainbow Book of Adventures* and its companion *The Third Rainbow Adventures Tape*.)



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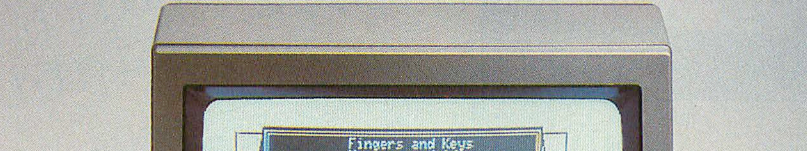

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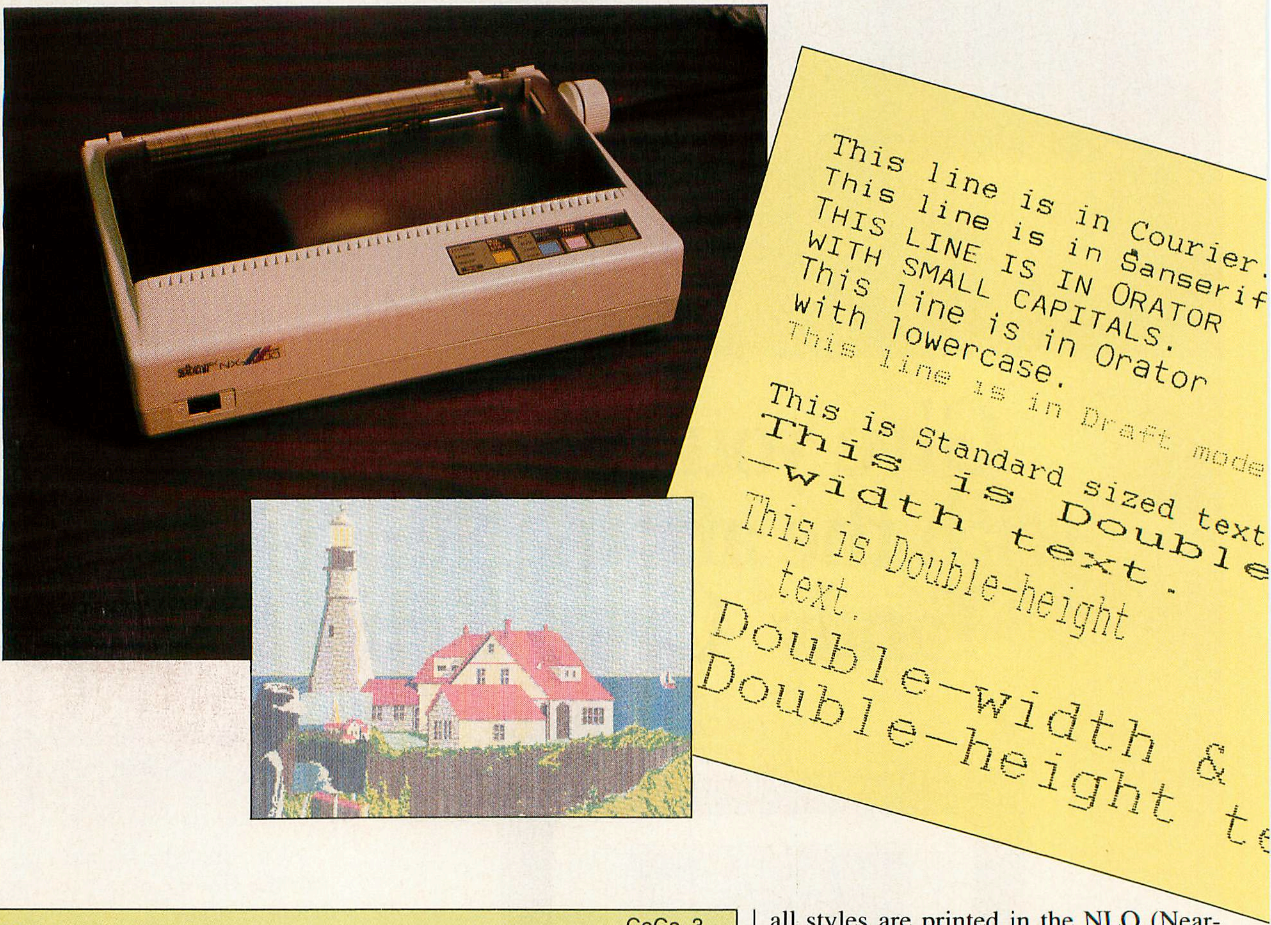

This line is in Courier.
This line is in Sanserif
THIS LINE IS IN ORATOR
WITH SMALL CAPITALS.
This line is in Orator
with lowercase.
This line is in Draft mode
This is Standard sized text
This is Double
-width text.
This is Double-height
text.
Double-width &
Double-height te

Hardware CoCo 3

Star NX-1000 Rainbow Printer— Let the True Colors Shine Through

It wasn't long after I bought my first CoCo that I began to realize the power of the machine. And I quickly realized I was going to need more than just a cassette recorder to harness that power. So, a few months later I got my first disk drive. This worked well until I wanted to share the results of my computing with others. The next major investment was a printer. I was happy with my purchase, a DMP-200 from Radio Shack for just $499. Since that time, the flexibility and power of dot-matrix printers has increased explosively. And one printer that stands up there in the front line is the Star NX-1000 Rainbow.

The Star NX-1000 Rainbow printer is an enhancement of another Star printer, the NX-1000. The only difference (an $85 difference) is that the NX-1000 Rainbow adds color. The NX-1000 Rainbow offers quite a bevy of features. Using a four-color (red, blue, yellow and black) ribbon, the NX-1000 Rainbow will print text in any of seven colors right out of the box: black, red, blue, violet, yellow, orange and green. It is a simple matter to send the proper codes to select any of these colors at nearly any time.

In addition to the color capability, the NX-1000 Rainbow offers five type styles: Courier, Sans Serif, Orator using small capitals, Orator with lowercase, and Draft. Each of these is available in standard or italic. With the exception of the draft mode, all styles are printed in the NLQ (Near-Letter-Quality) mode.

To offer even more choices, these styles can be printed in any of six pitches: pica, elite, condensed pica or elite, and proportional pica or elite. Finally, characters are printable in standard size or double-height, double-width, double-height and -width, and quad-height and -width. While I probably wouldn't use all of these possibilities, it is good to know the printer has the capability. It's almost like having a typesetting machine next to the computer table.

The NX-1000 Rainbow is average in terms of printing speed. It will print at 120 cps (characters per second) in the draft mode and 30 cps in any of the NLQ modes. This isn't all that impressive. At the same time, it pretty much matches most similarly priced printers in this department.

In addition to the standard character set (96 ASCII characters) and the IBM set (244) characters, the NX-1000 Rainbow offers up to 192 draft or 78 NLQ download characters. These characters are user-defined and allow the creation of small graphics or special symbols — handy for mathematics work. The only drawback, and it is a minor and very common one, to using download characters is the occupation of the normally active 8K text buffer, which leaves only a single-line buffer for received text in its place.

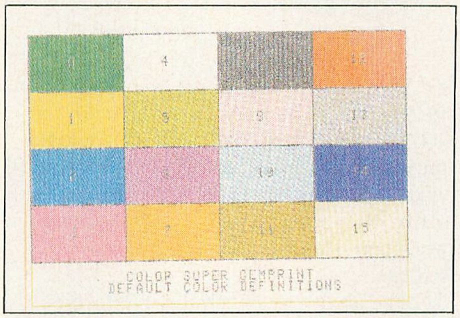
Over the past few years, more and more printer developers have moved toward allowing more complete control of the printer from the front panel. I like this trend and believe it reflects growing support of beginning/intermediate users. The NX-1000 Rainbow offers front-panel control of type style (including italics), print pitch and right and left margins. It also allows the user to clear the buffer, perform forward and reverse micro-feed (vertical paper movement in very small increments), and to park the paper. This is a long way from the standard linefeed/formfeed and on-line/offline buttons of just a couple of years ago.

One aspect I have not seen before is the front-panel lock. By pressing the front-panel NLQ button during power-up, you prevent software from altering printer style settings when it boots. Similarly, pressing the Print Pitch button during power-up locks out software changes to the pitch control. In either case, the settings can still be altered using the front panel. This "stay-in-panel" feature can prevent software designed for other printers from interfering with the NX-1000 Rainbow's settings. I imagine it was designed primarily for MS-DOS systems, but this feature deserves mention in the CoCo Community, as well.

Speaking of MS-DOS, the NX-1000 Rainbow features an IBM mode in which it emulates the IBM Proprinter II. This makes the machine quite versatile in an ever-changing world of computer systems. This emulation is available through a DIP switch setting. The printer can also emulate the Epson LX-800.

The NX-1000 Rainbow allows a great deal of flexibility through its use of both tractor-feed and friction-feed mechanisms. While these features are commonly offered together on other printers, the NX-1000 Rainbow takes them a step further. Like printers costing much more, the NX-1000 Rainbow features paper-parking. In a nutshell, this means the paper loaded into the tractor feed can be moved out of the way, by the printer, without removing it from the printer. After this is done, single sheets can be printed using friction feed. Later, it is a simple matter to "reload" the tractor feed paper. You see, by pressing two buttons on the front panel, you tell the printer to pull the paper loaded into the tractor feed back away from the platen to make room for single sheets. This can be especially useful for correspondence in a business setting.

You might want to keep mailing labels loaded into the tractor feed. To do a letter, you would park the paper (labels), write and print your letter, unpark the labels and print one, then repark them. No more hassle repeatedly loading and unloading the printer. Another advantage to this approach is the tractor-feed being a push-feed system. In other words, the feed mechanism is located behind the platen; it pushes the paper through the printer instead of pulling it, reducing paper waste.



Another thing I really like about the Star NX-1000 Rainbow is the ease with which the features can be selected from inside word processors. Type style, character size, the seven standard colors, and the bold and italic modes can be accessed simply by placing a command between double parentheses. For example, entering the characters `((S))2` right in the middle of your word processing document will cause the text, when printed, to come out in double height. When it receives a double open parentheses, the NX-1000 Rainbow looks at what follows, determines if it is a valid command, and if it is then executes it. You can even set up these commands in macros, if macros are supported by your word processor. This sure beats wading through a bunch of control codes. The following commands are accepted:

((F))0	Courier
((F))1	Sans Serif
((F))2	Orator, small caps
((F))3	Orator, lowercase
((F))9	Draft
((S))0	Standard size
((S))1	Double width
((S))2	Double height
((S))3	Double width and height
((C))0	Black
((C))1	Red
((C))2	Blue
((C))3	Violet
((C))4	Yellow
((C))5	Orange
((C))6	Green
((B))0	Bold off
((B))1	Bold on
((I))0	Italics off
((I))1	Italics on

Dayton Associates of W. R. Hall, Inc.

Dayton, Ohio, quickly becoming a high-technology city in the Midwest, is home for three large technical centers — NCR, Wright State University and Wright Patterson Air Force Base. Since Dayton is a growing, technical city, it seemed the appropriate place for the birth of Dayton Associates of W.R. Hall, Inc.

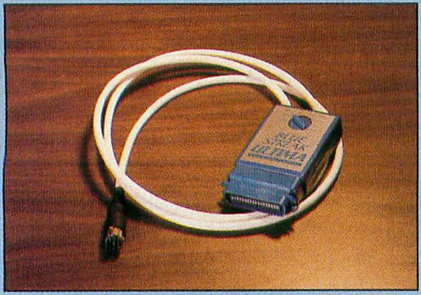
Dayton Associates was founded in 1983 by William R. Hall, a graduate from the Pennsylvania Institute of Technology. Hall is currently technical director of his company. The idea for Dayton Associates came under consideration when he was designing computer interfaces under contract for the Air Force. When the contract was complete, Hall decided to use his knowledge to design and provide interfaces for the CoCo.

Dayton Associates believes in the Color Computer, as exhibited by its exclusive use of Color Computers. In addition to design work, Dayton Associates prides itself in delivering complete printer packages (printer, interface and software), or "turn key" systems, to other CoCo users. In addition to the full product support offered, customers have the added security of knowing Star Micronics (the company that produces the printers sold by Dayton Associates) offers full support nationwide.

The success of Dayton Associates of W.R. Hall, Inc. can be attributed to Hall's easy accessibility, gaining him customers from five continents. Although the customer base ranges from commercial sources in America to American embassies and government agencies here and abroad, Hall claims that home computer users are his main customers. As a bonus, technical support extends even into the evening hours. ☐

The Blue Streak Ultima Serial/Parallel Interface

The Color Computer is designed to send data serially to a printer. Because of the special format used in the CoCo's serial port, this somewhat limits users to Radio Shack printers; after all, they are the only ones marketed with an identical port. Most other computers and printers are designed to communicate in a parallel fashion.



In serial communications, each character is sent down a single wire, one bit at a time. In parallel communications, all bits making up a single character are sent down several wires at the same time. This results in much faster, and usually more reliable, operation. A serial/parallel interface fits between a serial and a parallel port and allows these systems to communicate properly. Since most every printer has a parallel port, these interfaces have been very popular in the CoCo Community as a way to use other printers with the CoCo.

The Blue Streak Ultima is the latest in a long line of products from Dayton Associates. It is a serial/parallel interface that allows transmission up to 19,200 baud. Therefore, it receives serial data from the CoCo at up to 19,200 bits-per-second and presents that data to the parallel port of your printer. Dayton includes the Blue Streak Ultima with the printers it sells, giving the buyer a great deal of flexibility.

The Ultima is switch-selectable for 300, 600, 1200, 2400, 4800, 9600 and 19,200 baud data reception. All you need to do is set the switch and make sure your CoCo is transmitting at the same speed. This is accomplished via pokes to memory location 150 of the CoCo as follows:

`POKE150,180`	300 baud
`POKE150,87`	600 baud
`POKE150,41`	1200 baud
`POKE150,18`	2400 baud
`POKE150,7`	4800 baud
`POKE150,1`	9600 baud

In order to send from the CoCo at 19,200 baud, you must issue the poke for 9600 baud and then poke the CoCo for high speed. This is not recommended for those who don't understand it. And, in truth, it really isn't necessary — except, perhaps, when performing a color dump of a CoCo 3 screen.

The ability to switch the interface between baud rates is necessary with some software that is "hard-coded" and doesn't allow the user to alter the rate.

The interface is solidly built, yet looks good when placed in a system. It can be used in conjunction with a Y cable for those users wanting to share the serial port with a modem. Because of its high-impedance (15 kilohms) input, it doesn't require a serial switcher as long as it is used with a modem also having a Hi-Z input. The interface is available from Dayton Associates as a standalone item for $39.95, but is included with their printer systems. ☐

The nine-pin printer features a standard Centronics interface and 240 dpi (dot-per-inch) resolution in the quad-density graphics mode. The NX-1000 Rainbow is well-suited for use with the Blue Streak Ultima serial/parallel interface packaged with it by Dayton Associates. Dayton also sells the color ribbons for $10. To avoid waste during non-colored text printing, black ribbons are available from Dayton for $6.

While color printing can be useful in some text applications, the printer really shows its stuff with color graphics. See the photos for samples of what it can do.

To provide access to the color graphics abilities of the printer, Dayton Associates includes the *Color Imaging System* with the printer package. This software gives you a way to print `PMODE` and `HSCREEN` images in full color. Let's follow the process for a typical `HSCREEN` image.

The picture I wanted to print is an MGE, `HSCREEN2` image. I first loaded the image into *Color Max 3* and pressed Reset. This exited *Color Max 3* but left the image in memory. Then I ran `HRCSGP.BAS` from the imaging system disk. I followed some relatively simple prompts to a point where I was asked if I wanted to use the default colors or define my own. I chose to define the colors. This is done by selecting just how much of each color ink you want for a given palette slot. You see, for `HSCREEN2`, the artist has 16 slots available. With `HRCSGP`, you define how each of these slots will be printed by entering how much black, blue, red and yellow you want printed for that slot. You can select none, light and solid for each color in each slot — 81 different shades at your fingertips.

This color-definition capability has the advantage of allowing the user to redefine screen colors. You have complete control over what colors are printed. One example where this could come in handy is schematic work. If you have a color schematic done in *CoCo Max III* and you want it printed in black and white, you might set all slots to black except the ones controlling background color.

However, I find Dayton's implementation of this capability to be awkward and incomplete. In translating the colors, it is necessary to use a pad of paper to keep track of the colors in the 16 slots. And you really have no way of knowing how a particular mix is going to look on paper. I would like to see a utility in the package that prints out a color chart of all 81 variations. Then you could compare this chart with the actual screen color and know the best definition to use for each slot.

It is important to note Colorware offers a Star NX-1000 Rainbow driver for *CoCo Max III*. This new item was unavailable for this review. Still, for $19.95, it would seem to be the way to go when using *CoCo Max III* with the Star NX-1000 Rainbow.

As sold by Dayton Associates, the Star NX-1000 Rainbow includes the Blue Streak Ultima interface, the *Color Imaging System* and the software support disk. This latter disk includes tutorials on how to use your printer and to select its many features, as well as black-and-white screen dump routines for `PMODE` and `HSCREEN` images. The complete package sells for $279.95 plus $10 shipping. At that price, I think it is one of the best deals around, an excellent package at an excellent price. I suggest you give it serious consideration when you are looking for a printer system.

(Dayton Associates of W.R. Hall, Inc., 9644 Quailwood Trail, Spring Valley, OH 45370, 513-885-5999; $279.95 plus $10 S/H)

—Cray Augsburg

Software

CoCo 1, 2 & 3

The Aussie Collection— A Public Domain Six-Pack From the Land Down Under

Ever wish you could travel nearly halfway around the world without leaving your CoCo keyboard? With the *Aussie Collection* you can do just that. This interesting six-pack has something for everyone — music, games, speech, graphics and more. The *Aussie Collection* runs on any CoCo, from an old gray battleship to the newer CoCo 3, using the 32-character text screen and compatible graphics screen.

While most of the programs ran great, some of them had syntax or other errors. Most of the programs are written in simple

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Software Support Trio

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Online instructional program that will select 24 special features of your printer or display methods to incorporate them into your programs.

Super Gemprint

Will transfer Pmode 0, 1, 2, 3, or 4 picture screen to printer 8"x11" hardcopy. Black/white, white/black or grey level shading for color.

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Disk BASIC and can be edited by the user. There are no printed instructions, but you will find them in the programs when needed. Just remember that the English used is not American English. If you are told you will have ten "goes," that's 10 turns; even reading the text can be a lot of fun. For most of the files you can just type `RUN"`*filename*`"` or, in the case of `.BIN` files, `LOADM"`*filename*`":EXEC`. Some of the files are intended to be run or used by another program, as with the excellent geography lesson files on Disk 6.

"Music, Music, Music" is the theme of Disk 1, and it really is varied. You will discover everything from children's songs to national anthems, from bush songs to Scottish reels. Some of the songs are done with simple `PLAY` commands, but many are very nicely done in machine language. The ML songs sound as if they were programmed in at least four-part harmony and are quite impressive. I had almost as much fun with some of the titles as I did with the songs. I found the TV speaker did not do the ML songs justice and used my stereo to listen to them. I often found myself wanting to hear more when they ended. You may be surprised at just how good your CoCo can sound without MIDI or a music pack.

The novice CoCo user may find Disk 2's graphics and music tutorials helpful in learning more about CoCo's `PMODE` graphics and the `PLAY` command. Math fans may have fun with `QUADSOLV`, and I couldn't resist trying `BIGMONEY`. Who could? You may have a problem using `FUELCHEK` unless you have an odometer that reads kilometers and a gas station that serves "petro" by the liter; but if you do run the program, you can convert the results to miles per gallon. While the serious game player may scoff at `MATES`, I found that many of us may have forgotten just what fun a simple game can be.

On to Disk 3 we go. The first file, `HEADS`, is not a game of pictures of bathrooms for you sailors out there, but an information file about using the disk. Disk 3 has 30 `PMODE` picture files and a couple of BASIC programs to print the pictures as letterheads. The printer programs cover the DMP-105, 110 and 130 Radio Shack printers and are written in BASIC. While I was not able to use the printer programs, the pictures are exceptional; in fact, I may write a driver for one of my three printers just to be able to use them. None of my printers are compatible with the DMP printers. If you want only to view these pictures, you can type `LOADM"`*filename*`"`, then enter `10 PMODE4:SCREEN1,1:GOTO10` and run to see them.

Disk 4 was disappointing because both `JOYDISK` programs and all three shooting games had errors and would not run. The kids had fun with `SHIPSUB` but the `UFOMAZE` game was too hard, even for me. But then I'm not a die-hard game player. If you want to play `SKELQUIZ`, you had better study up on the names of your body's bones first! All the games on this disk are written in BASIC, and I found the play much better with the speed-up poke.

If you don't believe me when I say Disk 5 is alive, just run `HELLO`! You will be greeted by the author of this disk through your speaker, Australian accent and all. Want to learn about what they eat in the Land Down Under, run `SHOP`, a grocery database program that will print a list for you. While `SHOP` may not be fancy — do not expect pretty formatting of the screen or printed listings — it was interesting reading for this Yankee.

`CANON` is a challenge of setting a cannon's angle to hit your target, and `LLIST32` is for printing program listings in a 32-column format. `DIGI` is a utility for digitizing sound (remember `HELLO`?) and to play it back via the TV speaker. `DIGI` can also save or load digitized sound to or from disk or tape. `MCBASE` is a mini name and address database program. Some of the programs were very simple but informative. `LOWRCASE` was of limited value on my CoCo 3; it's intended for the newer CoCo 2s, to give you a true lowercase display on the 32-character screen.

Last, but not by any means least, is Disk 6. This disk contains a collection of five files that make up a geography program. `GEOG` can be used as a tutorial or quiz about Australia. The program uses `PMODE 3` for its graphic displays and is well-done. I found it both educational and interesting to learn about the Land Down Under. Text screens are used to give a lot of information about everything from rainfall to industry, while maps of Australia graphically show where these regions are located.

While I could not cover every program on all the disks here, I hope I've given you a good idea of what is in the *Aussie Collection*. On the whole I found the set entertaining, fun and educational. My personal favorites were the music, letterhead graphics and geography disks. Although disks 2, 4 and 5 might not be of great interest to the more experienced CoCoist, disks 2 and 5 could be fun and helpful to the beginner. A few of the programs (five out of 11 program files on Disk 4) had errors and would not run.

The company offering *Aussie Collection*, The Public Domain Software Copying Company, offers some extras to its programming customers. If a user returns an improved version of a company program (provided there's a note of explanation of the modification), that user receives credit for a free disk on his or her next purchase. People who donate original or downloaded programs receive two free disks on their next purchase (but they must include a letter of origin). Also, students and users group club members receive a 15 percent discount on any order.

(The Public Domain Software Copying Company, 33 Gold St., Suite L3, New York, NY 10038, 800-221-7372; $39.95 for the set or $10 each, $4.50 S/H: First product review for this company appearing in THE RAINBOW.)

—J.D. Walker

Software CoCo 3

DaVinci3— An Environment for Your Masterpieces

DaVinci3 is a low-priced, high-resolution (320-by-192, 16-color) graphics creation and editing program for the Color Computer 3 that offers most of the features available in its higher-priced competitors. *DaVinci3* requires at least one disk drive and some type of input device (a joystick, x-pad or mouse). It should be noted that a Hi-Res interface, or any other hardware device, is *not* required. A printer, of course, is optional. I found *DaVinci3* ran equally well under Disk BASIC 1.0/1.1 and *ADOS3* (as long as the *ADOS* disable command was used).

The program is unprotected, and the user is encouraged to back up the disk to create a working copy. The working copy must *not* have a write-protect tab on it, as the program will write to disk from time to time during its normal operation.

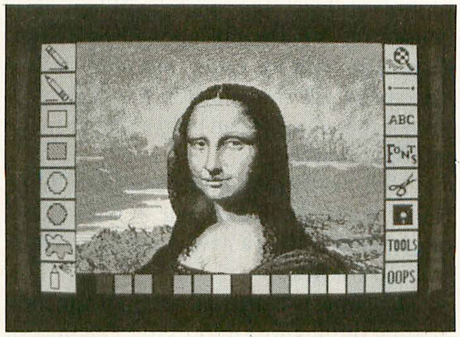
DaVinci3 comes with a 13-page manual, which is well-written and leads you through all the features of the program applications and the included "convert" utility — it transfers standard `PMODE 3` or `4` pictures saved in binary format (loadable with a `LOADM` command) to a format you can then load into *DaVinci3*.

DaVinci3 supports a lot of features, but it tends to run a bit slowly at times. For the most part, though, operation is smooth and timely. The program has a rather unique method of implementing Hi-Res control: By pressing the space bar, you toggle between "fine" and "regular" modes. In the fine mode, the travel of the cursor is limited, but the ratio of joystick motion to screen motion changes to allow for detailed work.

DaVinci3 will create one full graphic screen (320-by-192); there is no two-page, double-screen feature. The printouts I made took up roughly one-half of a standard piece of printer paper. Printers supported include the Star NX-10 and the DMP 105, 110 and 130. The CGP-220 is supported in color, which is quite impressive. Color replication from screen to paper is fairly accurate. The one problem with printing seems to be a slight flattening of the picture.

Both RGB and composite monitors are selectable upon bootup. More detail is provided, of course, with an RGB monitor, but I was impressed with the look on a composite monitor, as well as with that of a regular color TV. At any rate, the program can be used with whatever type of display you may have.

As soon as you have booted up and chosen your display type, you will be in the drawing screen. From here you can select any of the program's drawing options, the disk access menu, the printing menu, etc. When you press the CLEAR key the borders disappear, and you are given full editing capabilities of the entire screen. The CTRL key also has its own special function, toggling Zoom — always a welcome feature in any graphics editor. *DaVinci3* has a 400-percent Zoom feature, which is more than adequate for the finest of detailed work.



Text (40 columns by 24 lines) can be entered in your graphic in six fonts: Standard, Mac, Roman, Italic, Old English and Bold Italic. Upper- and lowercase letters are supported via the SHIFT-0 combination.

DaVinci3 supports an "Oops" function that will restore the top 80 percent of the screen. The bottom 20 percent remains as it was prior to the Oops command. To avoid this, two special keys, F1 and F2, can be used before making drastic changes to your picture. The F1 key, when pressed, will force the saving of the full screen to the Undo buffer. When the F2 key is pressed, it will restore the picture saved by pressing the F1 key. You can also capture screens from other graphics creation programs, games, etc., that use the Hi-Res screen by pressing the F2 key before making any menu selection when you start the program. Provided the previous program's screen is still in memory, this is accomplished usually by exiting the other program via the Reset button. When *DaVinci3* starts, it automatically saves whatever was left on the Hi-Res screen.

After you select a color from the color bar, the arrow keys allow you to tune it. For composite monitors/TVs, the left arrow key will change the color in sort of the order of the spectrum: red, orange, yellow, green, black/grey, blue-green, blue, purple, etc. The right arrow adjusts the color in the opposite direction: red, purple, blue, blue-green, black/grey, green, yellow, orange, red, etc.

There are four intensity settings (dark to light) for each of the 16 available hues. The up arrow will make the color lighter until it is as light as it can get. The down arrow will make it darker until it reaches its darkest shade. Brown tones are achieved by using dark oranges or yellows.

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"I cannot imagine the CoCo 3 without ADOS-3; it would not be a complete machine."
The RAINBOW, July 1987

You've moved up to a CoCo 3. A powerful new machine. Now, it's time to give BASIC a shot in the arm, with ADOS-3. Wouldn't it be nice to turn on your machine and be greeted by an 80-column display, in the colors of your choice, with your own custom startup message? To run routinely at 2 MHz (double speed) without having to slow down for disk and printer operations? This and much, much more is possible with ADOS-3, our CoCo 3 adaptation of the acclaimed original ADOS, which shares the original's virtual 100% compatibility with commercial software. After customizing ADOS-3 using the provided configuring utility, you can have it burned into an EPROM that plugs into the Disk BASIC ROM socket, or just use it in RAM as a disk utility. (EPROM + burning will cost $15-20; we provide information concerning how you can have this done.) Supports double-sided drives (35, 40, or 80 tracks). FAST and SLOW commands, auto line number prompts, RUNM command, keystroke macros, arrow-key scroll through BASIC programs, auto-edit of error line, and many more valuable features.

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Analog RGB color control differs from the method used in composite mode. In RGB mode, the left arrow controls the red component of the color, the up arrow controls the green, and the right arrow the blue component. Each of these components has four intensities: off, dark, medium and light. Color tuning takes a bit of getting used to; but after a bit of experimentation you will end up with the palette of colors you want.

In summary, I find *DaVinci3* to be an enjoyable, easy-to-use and extremely affordable graphics editing program. It runs very well under 128K, but I would like to see it support more features at 512K. The low price is refreshing.

(Owl-Ware, P.O. Box 116-A, Mertztown, PA 19539, 800-245-6228; $37.95)

—Dan Hagarty

Software CoCo 3

Memory— Test Your Concentration

Think quickly — was the star in the upper left-hand corner? Or maybe somewhere in the middle? *Memory* is a Concentration-like game in which you match pairs of shapes or pictures by turning over cards on the game screen. It runs on any CoCo 3 with a disk drive and joystick. RGB, composite video and television displays are supported.

Each game screen has 18 pairs of hidden objects for the players to match. Using a joystick, players move the flashing cursor to the desired card. Next they press the joystick button to display it. This process is repeated to choose a second card. When players make a match, they earn a point and their turn continues. If there is no match, the cards are flipped over and the game continues with the next player.

Memory will accommodate up to four players. The players enter their names on the screen before starting the game; each name is marked in a different color, which comes in handy later. Cards that are matched are framed in the player's color.

A one-player game is also available; the player competes against a clock that is displayed at the top of the screen. In single-player rounds, the goal is to match all the objects in the least amount of time.

At any time during a game, a player can press the space bar to pull down the combination Help/Menu window. The current player has five options. "Show" uncovers all the cards so the player can see what is under them. However, the show can't be undone. This is unfortunate since younger children would benefit from a quick "show" of the objects prior to play.

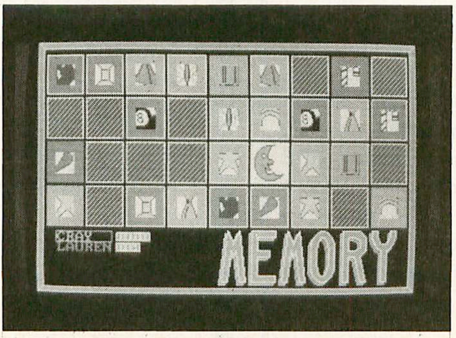
"Clue" is available to players who have scored at least one match. When it is chosen, five cards are uncovered at random. This feature costs one point to use but can be advantageous in the latter portion of the game. It can help a player make multiple matches.

"Help" only explains the options in the Help menu. It doesn't deal with game rules. "New" starts a new game, and "Quit" exits to BASIC.

The game is hardly an original concept, but one of the most impressive features of the program is that it shows off the CoCo 3's graphics capabilities. In the opening screen, for example, the programmer utilizes multiple colors and flashing text. A pull-down menu is available during the game. Graphics are detailed and colorful when viewed on an RGB monitor. All of the above are accomplished primarily with the CoCo 3's Extended BASIC.

Documentation consists of a single folded page that briefly outlines game rules and loading instructions. Since the game is familiar to almost everyone, a detailed manual isn't necessary.

Memory is simple and straightforward. A young child who has some basic shape discrimination skills can play with minimal direction. Although it appears to be most appropriate for preschool through second grade, adults and older children can easily get hooked. My 5-year-old daughter brought in the kitchen timer to make sure everyone in our family got equal turns using the program.



In games such as these, familiarity can breed boredom in the form of repeating screens. Apparently the program's author considered this problem. Each *Memory* round is built from a pool of more than 46 pictures, which appropriately include an integrated circuit chip and a rainbow (it's too bad the author didn't also think to include a picture of a CoCo). Although some of the shapes will reappear in each game, it's very unlikely that they'll be in the same order.

If you're interested in a good Concentration-type game at a reasonable price, you'll enjoy *Memory*. I've reviewed three games of this type over the last few years, and this one is the best so far.

(RAM Electronics, 814 Josephine, Monmouth, OR 97361, 503-838-4144; $19.95)

—Mark Haverstock

Software CoCo 3

VIP Writer III, Version 2.0— Another Step Toward Perfection

I should preface this review by telling you that I use a word processor a great deal in my profession. Most often I use it to draft legal documents, to review and edit the work of others and to write computer programs. Parents with foresight encouraged me to take a typing class before I entered high school, and consequently I came to depend on my typing abilities throughout college and after. It was natural, then, that word processing would become the principal use of my first personal computer — a 4K CoCo in May of 1982.

A lot of word processors have been available in the history of the Color Computer. Tandy's original *Color Scripsit* ROM pack, with its 32-by-16 screen format, fascinated me at first, but really only whet my appetite for word processors yet to come. Of all the other word processors that have come and gone, *Telewriter* and *VIP Writer* seem to be top-ranked among user favorites. Early versions of these programs broke the 32-column barrier and made word processing on the CoCo much more palatable.

Having never used *Telewriter*, I can't comment much about it. I can say, however, that prior to the release of *Telewriter 128*, it seemed patches were frequently published to give it features that *VIP Writer* already had. The truth is I have owned and used *VIP Writer* for a number of years and always was and still am more than perfectly satisfied with its near flawless performance. Once I became acquainted with its many features, I often remarked to my associates that *VIP Writer* had moved word processing from the realm of being a typewriter substitute to near-typesetting. With the advent of the CoCo 3 I hoped word processing would be taking another leap forward in sophistication.

Enter *VIP Writer III*, Version 2. My wife says it doesn't take much to get me excited. When I received RAINBOW's review package at the office in the morning mail, I couldn't wait to get home to try the program out. I went to lunch alone so I could read the users manual uninterrupted. I even started thinking of excuses to cancel my late afternoon appointment. Common sense eventually prevailed on this last point and I stayed the day.

When I finally got Version 2 home and looked at the disk's directory, my attention was first drawn to a configuration program included. This program permits you to alter a number of default parameters: foreground, background and cursor colors; baud rate; page length; top, bottom, left and right margins; printing to the serial or parallel port; linefeeds; justification; filename extension; the programmable keys; etc.

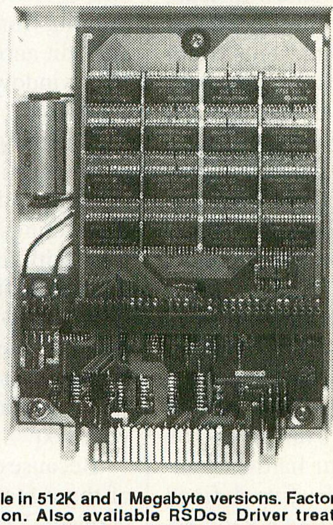
Being able to set all these items minimizes much of the startup ritual one goes through every time the word processor is loaded. I found it easy to make one custom copy of *VIP Writer III* for each printer or special job. Another new feature is the "work space" command. It permits 512K users to access nine 48K work areas in memory. To and from these areas, separate files can be saved and loaded much like a RAM disk. Switching between areas is instantaneous.

What else is new? Well, the authors of Version 2 must have taken some hints from Lauren Willoughby's review of *VIP Writer III* (Version 1) in the September 1988 issue of THE RAINBOW. Version 2 now has two save commands, one that saves the entire document to disk regardless of cursor position within the file and the second that saves from the current cursor position to the end of the file. Also, the F2 key has been given the function of a true backspace/delete key to avoid the old two-step process.

Other additions include a help menu that appears on boot-up; it is banished when you press the BREAK key to enter the text area. For those who confuse the CTRL key for the CLEAR key — which actually is *VIP Writer*'s "control" key — you will be happy to know that CTRL now functions just as the CLEAR key does, with the exception that CTRL invokes the pop-up help menu. The last of the major additions is a command that lets you designate whether printing will be directed to the serial or parallel port.

I noticed that it has been over five years since *VIP Writer* (then known as *Super Color Writer II*) received its fine review in the October 1983 issue of THE RAINBOW. The reviewer, Stuart Hawkinson, called it "...one of the best word processors available for the Color Computer, or any computer for that matter." I'd say Mr. Hawkinson's original assessment still applies. However, lest I get too carried away with all the enhancements, potential first-time purchasers ought to know that *VIP Writer III*, Version 2, has almost every conceivable feature one could ask for in a word processor. There is simply not enough room in this review to discuss each of the *VIP Writer*'s many features. It should suffice to say that I have used several $500 word processors at my office and that *VIP Writer* outshines them all in power and versatility. In addition, it comes with a free 50,000-word dictionary program for automatic spell-checking.

I greatly appreciate programs with clearly written instructions and documentation. In this regard you'll find *VIP Writer*'s 125-page tutorial a real prize and professionally packaged. It's also nice to know that if



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your interests go beyond word processing, *VIP Writer* is part of an integrated library. For a lot of people, it's quite possible that the library may be as complete a software package as they'll ever need!

(SD Enterprises, P.O. Box 1233, Gresham, OR 97030, 503-663-2865; $79.95)

—Ernest Zore

Software CoCo 3

Simply Better— The Most Bang for Your Buck

At one point or another, most Color Computer users develop a need or desire to do word processing with their computers. Unfortunately, when the time comes to purchase the software, many of us go into the process unarmed. We know only that we want to be able to type text into the computer and have it printed on paper. And, of course, we are looking for a good deal. So, we often choose the least expensive package on the market. And we end up cursing that day. Well, times are changing! *Simply Better*, the newest entry in the vast array of Color Computer word processors, is an excellent choice at an unbelievable price.

For those who have been a part of the CoCo Community for some time, *Simply Better* will seem to be a variation on *VIP Writer III*. In fact, many of the commands work identically. For these people, the transition will be natural. For those who have never seen *VIP Writer*, this system contains all the features necessary to produce text quickly, efficiently and professionally.

Simply Better is a complete word processing system for the Color Computer 3. It comes on a nonprotected disk and includes a comprehensive manual. Written entirely in machine language, the program is fast. I consider the super low price to be plenty of protection. And with the support offered, it would be foolish not to purchase and register the package legally. The system offers a total buffer size of 472K and, through the use of a window, features optional print spooling. In addition to standard full-screen editing abilities, this system allows you to create a table of contents or index for your text on the fly. It includes mail-merge capability and even allows editing of multiple documents. Let's dig in a little deeper.

Simply Better is command-driven. By this I mean you enter commands rather than select options from a menu to tell the system what you want it to do. Some people do not like a command-driven operating environment; in the case of word processors I prefer it.

There are two major modes of program operation. In the Command mode, you can enter abbreviated commands to control the system: save files, load files, alter parameters, etc. For the most part you will use the Command mode for disk I/O and to alter the text format, onscreen and printed. Of course, the Text mode is where you will spend most of your time with *Simply Better*. This is where you enter and edit your text, and the capabilities of the system really shine. In this mode, commands are entered, or initiated, by pressing control and function key combinations. Extensions of the Text mode are the Window mode and View mode. In the Window mode, you essentially have two identical word processors on the screen at one time. The View mode (just press CTRL-V) shows you onscreen pretty much how your text will look when printed, including margins, fonts and page breaks.

Simply Better allows the definition of up to five different printed fonts. These might include condensed, italic, bold, elongated or any other font supported by your printer. The definitions can be changed at any time. Obviously, in the interest of saving memory and increasing speed, these fonts do not appear on the screen. In other words, when you select italics, your text onscreen won't appear in italics. Instead, each font can be set to show in your choice of screen colors (foreground and background) to make it easier to tell them apart. Because the hardware uses 40- and 80-column screens (built into the GIME chip), cursor movement through the text is very rapid. In addition to the defined fonts, the system offers underlining, which *does* appear properly on the screen. On the flip side, *Simply Better* features a "Clean" command that will quickly remove all print font and underline markers from your text.

To gain access to other features specific to your printer, *Simply Better* allows embedded control codes. This gives you complete control over your hardware instead of limiting you to the five defined fonts. I like the way this feature is handled. First, you enter a "begin printer codes" marker. Then, using the ALT key for values from 1 to 31, you enter the ASCII characters for the control code you want to send. For example, to send the escape character you would just press ALT-1. Finally, you'd close the code with the "end printer codes" marker. When the file is printed, the printer will accept the control codes and print the text accordingly.

Items in your text can be sorted alphabetically using *Simply Better*'s Sort command. You place a Sort marker (press F1 followed by S) by each item you want sorted and press CTRL-S. *Voila!* And the sort is designed in such a way that any font designation for a given item stays with that item throughout.

Block manipulation is a breeze on *Simply Better*. And the system supports over 79,000 blocks on a 512K CoCo 3! This should be enough for *most* applications (I know somebody will disagree). You can copy, delete, move, sort, save and load blocks of text. More important for me is the ability to copy blocks of text from one window to the other. Let's take a closer look at *Simply Better*'s multi-document abilities.

Simply Better uses a dual buffer system; the primary text buffer is where you normally enter your text. However, by jumping to the Command mode and entering `WINDOW`, you open the alternate text buffer. This creates two windows for text editing, both of which are visible onscreen. The alternate window appears beneath the primary window, and you have control over just how big each window is in relation to the other. Each window can have a different text file in it. To move from one window to the other, just press the CLEAR key (as in OS-9). I particularly like this feature. It allows me to refer to one document while editing a second. It also allows me to copy blocks of text from one to the other. This is also the means by which *Simply Better* offers print spooling. Start printing from one window, press CLEAR and edit another file in the other window. The window feature is a writer's dream come true.

One thing I have always found tedious in writing is the creation of a table of contents and an index. *Simply Better* does these things on the fly by providing the user with index and table of contents markers. After you print the text, you will find the newly created table of contents or the new index at the end of the file in your buffer. These tables can then be edited as you see fit and placed at the beginning of your text.

Because of memory requirements, both of these features cannot be used simultaneously. Yet I find the method suggested in the manual for using these features to work best in the long run. You enter your text and save it without any such markers, then go through and place the contents markers (just press F1 then T) and create that table. Once finished, save the table by itself. Now, reload the file, create the index (this time use F1 and I for the markers) and save it. All that remains is to load the original file and append the constants and index pages to it.

Anyone who completes forms on a regular basis will appreciate *Simply Better*'s print-fill feature, which lets you create a computerized copy of the form and save it. To print an actual form, load your printer with the preprinted form, fill in the blanks on the screen and print. Only the information necessary will be printed, and you will have a crisp, neat printed form. This feature eliminates most of the guesswork in using a computer for pre-printed forms, and it makes the typewriter unnecessary.

To round out clerical work, *Simply Better* can be used for mail merging, which is a great way to make fast work of form letters and the like. First, you create a file containing a list of the information to be included in the merge (a set of addresses, for example). Then you write your form letter and append the list to the end. A few quick keystrokes are all that's needed. And the information file can be updated as necessary.

Another powerful feature is the inclusion of tasks (macros). A task is an often-repeated series of keystrokes that's been reduced down to a one-keystroke combination. For example, let's say you have a table of numbers, each with a leading zero in screen Column 4. To delete this character from 25 successive lines, you would have to move to that position on each line and then delete the character. But you could program a task with the same keystrokes it takes you to manually delete the zero in *one* line, then tell the system on how many lines you want this same task performed. Press CTRL and the number key assigned to your task, and your work will be done for you. We all know the computer can do our work much faster if we let it. And what I've just described is only a small example of what tasks can do. *Simply Better* allows for up to 10 simultaneous tasks, and each task can be altered at your discretion. The tasks are very easy to create and use, and you can even save them to disk for use during later editing sessions.

Another handy item is the "next number out" feature. You can use this to create numbered lists in a flash. Just use the Number command to set up the starting number and increment (or decrement, if you wish). Then, when you press CTRL-N, the software will generate the starting number. A second press of CTRL-N produces the next number in the series, based on the chosen increment. Just keep pressing CTRL-N (or use SHIFT-@, *Simply Better*'s function-repeat keys) and you'll get successive numbers on the screen. This is great for writing BASIC programs using a word processor. And it has 101 other uses, too. Combined with the power of tasks, it is easy to produce checklists of nearly any length.

Other more standard features include complete control of justification (left, right, center or both), headers and footers, auxiliary text lines and pagination. Not so standard is the "insert page number" command that causes the current page number, whatever it might be, to be printed anywhere in your text.

Simply Better is designed with customization in mind. Once the main program is loaded, you have the option of overlaying the parameters section with a configuration file. Included are files for green screen and amber screen monochrome monitors as well as one for RGB monitors. And by running the included `CONFIG` program, you can create your own custom setup. Upon running `CONFIG`, you are greeted with a screen that allows you to select the startup size for the primary and alternate buffers on 128K and 512K machines. You can also select screen width, the number of tracks per disk, word wrap on or off, verify on or off, whether the program starts in the insert or overstrike mode and more. The second page of `CONFIG` lets you customize the print fonts for your printer. This is also where you choose the foreground and background colors for how these fonts will appear on the screen. The final page of `CONFIG` lets you determine default parameters for justification, pagination, headers and footers, margins and much more. Of course, any defaults can be changed quickly during actual editing, as well.

The 138-page manual accompanying *Simply Better* is well-written and liberally sprinkled with excellent examples of how each feature is used. Once you have some understanding, you can call up help screens in any mode to give you that last nudge during editing. It is obvious every care was taken to make sure this package is complete. For example, the system uses beeps to alert the user that input is required or that an error has occurred. For the hearing-impaired, *Simply Better* includes an "eyes" option that flashes the screen border instead of beeping. The flash is very noticeable, even from across the room. This option is just one of many useful and thoughtful touches by the author, Dale Rickert.

In addition, Mr. Rickert is starting a newsletter to support the system. This publication is intended as a medium for *Simply Better* users to help each other by providing hints, tips, fixes and other useful information about the software. I applaud Simply Better Software for its complete support of its fine product.

Simply Better includes other features too numerous to be described in depth here. The system does more than most people will ever want. But it is really nice to have the capabilities available when you do need them. The features don't get in the way or make the program difficult to use. The program is *easy* to use and, in my estimation, rates high in efficiency and productivity. At $29.95 for the complete package, I don't believe you can get a bigger or better bang for your buck anywhere else.

(Simply Better Software, P.O. Box 20726, Portland, OR 97220, 503-254-7225; $29.95: First product review for this company appearing in THE RAINBOW.)

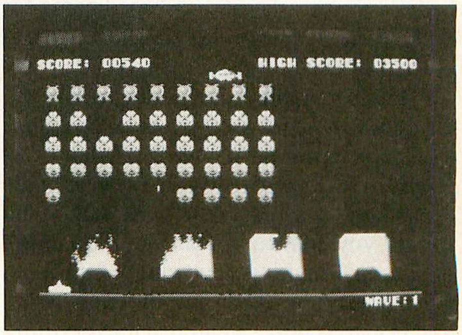
—Cray Augsburg

Software CoCo 3

Space Intruders— A Space Invasion

For anyone out there who has never played a *Space Invaders*-type game, it goes like this: You command a laser station that moves horizontally along the bottom of the screen. Above your gun are four bunkers that serve as protection. Above these bunkers are five rows of aliens. The object of the game is to prevent the "intruders" from landing. You accomplish this by blasting them as they move back and forth across the screen.

Space Intruders is a classic *Space Invaders* game for your Color Computer 3. It works with both RGB (including European 50 Hz RGB) and composite monitors, and can be played with either a joystick or the keyboard.



The game comes on a tape or copy-protected disk with a four-page manual, which really provides all anyone needs to know to play the game. The graphics are excellent. The bunkers and creatures are shaded to give a pleasing three-dimensional look, and the gun barrel recoils when it fires. The game also maintains a list of high scores during play (but doesn't save them on disk). When it's not being played, the game alternates between the title screen and a demo mode.

Game Point Software offers free replacement during the first 90 days and charges only $3.50 thereafter. Although copy protection is really annoying, you don't have to worry about wiping out your game disk, because replacements are easy to obtain.

If you like *Space Invaders*, *Space Intruders* is a must. The graphics and music easily match the best you'd find in an arcade hall.

(Game Point Software, P.O. Box 6907, Burbank, CA 91510, 818-566-3571; $24.95 plus $3 S/H)

—Robert Marsa

Software CoCo 3

Ghost Hunters— Ugly surprises for the Faint of Heart

Here we go again, just like in the horror movies. Doctor Blankman and four of his associates (two men, two women), are wandering about in a ramshackle old place that would give Dracula the creeps. Do they have a platoon of Army Rangers or the L.A. SWAT Team with them? No, no, no. They're going to rely on themselves. As a consequence, they are going to encounter numerous ugly surprises as they plow through ankle-deep dust and brush cobwebs as big as fishing nets out of the way. Some of them will not survive the experience.

I happen to hate ugly surprises. SPORTSware's latest disk-based game for the CoCo 3, *Ghost Hunters*, is full of them — part of the design, old chap.

This is a stand-alone game, independent of SPORTSware's *Wargame Designer* system (see my review in the August '88 RAINBOW, Page 126). However, since Americans love to fiddle with and adjust things, you could also consider it "priming the pump," making you want to buy *Wargame Designer*. After all, most of us are like Oscar Wilde: "I can resist everything except temptation." Especially us CoCo-nuts.

Ghost Hunters is excellent as a stand-alone for the non-fiddlers. There are five of you attempting to save the planet from demonic possession and enslavement. All you have to do is collect four plasma disruptors from various parts of the old Steadman place and use them to close the portal — to the Abyss. What could be more straightforward?

Think again, Poopsie. The old Steadman place (the game presents a side view of the four-story house) is overrun with ugly surprises such as skull-and-crossbones symbols, specters that look like rabid rock stars, green spiders with red legs, and other assorted hostile spirits. I mean, these things are ug-*LY*. You can tell that because of the superb graphics, which are especially brilliant on an RGB monitor. They are also nice on a color TV, but refer to the quotation above about temptation. In fact, after reviewing *Wargame Designer* last year, I bought an RGB monitor.

You don't see the ghosties and beasties and things that go scritch in the night until they're right on top of you. Oh, sure, you get quick flashes of the demonic reserves now and then, but all ghostly movement is hidden (unless you cheat by pressing a shifted 3 during the combat phase). During the ghosts' movement phase, you can hear little sly "scritch" noises, like what small, sharp claws might make on a chalkboard. That's followed by a slight "tink," like cheap glass being tapped. I don't know what that means, but it doesn't sound good.

Although the game is designed for one player, it does have a two-player option. There's also a game save capability, and it's not a bad idea to take advantage of it every once in a while. That way you don't have to start from scritch every time you get overwhelmed by the spirits. The four pages of instructions also say to stick together so that the demons can't chip away at your strength. Heed the warning! Once I forgot to pick up one of the plasma disruptors and sent poor old Dr. Aggon (he's the one that looks like Joe Stalin) back after it. He never made it. After being attacked by three or four demons he just disappeared. Pity; he was always a lot of fun on May Day.

Also, watch your route from one plasma disruptor to another. The brown trapdoor things can be opened, as can the doors (at a cost to your movement points), but other holes can't be used. This complicates things, especially when you see brief (brief!) flashes of the spirits' reserves and you may have to fight your way through them. With practice, you'll also figure out how to move your people without one blocking another's path. Until then they'll tend to jam up in doorways, which just makes the leading one that much more vulnerable to getting attacked by several demons at once.

Ghost Hunters is a fun game, one in which you not only get to use some tactics but also to exercise some planning. It's not easily mastered, so for $15 it's a good buy. And in case you either already have *Wargame Designer*, or decide to buy it, the instructions have specific and easy-to-read steps to add the basic (pun intended) *Ghost Hunters* "do it yourself" modification programs.

(SPORTSware, 1251 S. Reynolds Road, Suite 414, Toledo, OH 43615; 419-389-1515; $15)

—John M. Hebert

Hardware

TelePak— A Replacement for the RS-232 Pak

The CoCo market is amazing. No sooner does one product or supplier disappear when another steps in to take its place. That's the way it is with Orion Technologies and its products, TelePak and TelePak+. Tandy dropped the Deluxe RS-232 Program Pak some time ago. Most Radio Shacks no longer stock this item. Yet it's necessary for reliable serial communication — especially when speeds exceed 300 or 1200 baud. The two versions of TelePak serve as a replacement for the Tandy Pak. One is essentially a functional duplicate of the original; the other adds a power supply to the cartridge. Neither has the internal ROM-based communications program; but since it was really useless, that's no loss.

The only difference between the two versions of TelePak is in the power requirements. The TelePak uses the 12-volt power supplies built into the original CoCo 1 and all Multi-Paks. The TelePak+ can be used with any CoCo because it has voltage converter circuitry built in. Each version comes in a case that is the same size as Tandy's newer disk drive controllers. In addition to the Pak itself, Orion includes a minimal, but adequate, manual. The manual includes wiring diagrams for connecting TelePak to other RS-232 devices and to a null-modem adapter. It also contains programming information for the hardware registers. This information is complete and correct, but rather sparse.

A device such as this either works correctly or it doesn't. TelePak works exactly as it was designed to work. I tested it with several communications programs using a modem at 1200 baud and using a direct, null-modem connection to another computer at speeds up to 19,200 baud. It worked exactly the way the original Tandy unit worked. Orion claims compatibility with *Autoterm*, *XTerm*, *The Wiz*, *V-Term*, *Mikeyterm*, *Greg-E-Term*, *Rickeyterm* and

Ultimaterm. I have no reason to doubt these claims. My tests were done using Kermit, *XCom-9*, *Datapak II+* and a program of my own.

Construction of the TelePak is clean and solid. There is little more to say about the device. It doesn't require any special programming because it duplicates all the functions of the Tandy Pak.

Orion warrants the equipment for 30 days. After that time, it will repair or replace defective equipment for a reasonable fee for up to six months after purchase. If you are in the market for an RS-232 pack, TelePak is one of few choices. It's fortunate that Orion chose to produce this device and did the job right. The equipment is solid and performs well, the manual is adequate and correct, the warranty is good, and the price is reasonable. What more could we ask for? I, for one, am looking forward to seeing more of Orion's offerings.

(Orion Technologies, P.O. Box 63196, Wichita, KS 67203, 316-946-0440; $44.95 for TelePak, $49.95 for TelePak+, $3 for S/H: First product review for this company appearing in THE RAINBOW.)

—Donald L. McGarry

Software CoCo 3

Picture Puzzles— A New Twist to an Old Favorite

When I was a kid, almost every Christmas I would get one of those little puzzles in my stocking — the kind with 15 numbered tiles arranged in a four-by-four grid (one tile missing). With the tiles thoroughly scrambled, the object was to slide them around and restore them to the proper numeric sequence.

Picture Puzzles, a program from JR & JR Softstuff for the Color Computer 3, is very similar in concept, except that it uses a six-by-six grid. And instead of numbers, the "tiles" are pieces of a graphic design. The arrow keys are used to slide the puzzle pieces around on the screen in order to reassemble the picture in its original form. If what I have described so far does not have you clamoring to order this program, I certainly understand. When I opened my review package and looked at the documentation, I wasn't exactly thrilled either. I confess I didn't even bother to verify that I could load the program for two days after receiving it. When I did decide to do so, I figured I would spend 10 or 15 minutes with the thing, and then ignore it for a few days until I felt ready to deal with a boring program.

Four-and-a-half hours later it was 2 a.m., and I reluctantly realized I should stop playing *Picture Puzzles* and go to bed before it was time to get up.

The following night I set out to write my review, reasoning that I had doubtless spent enough time with the program to proceed with the real task at hand. Somehow, my "one more game" stretched into several hours, and I did not get anything written. A similar thing happened the next night. And the next.

Tonight, though, through astonishing self-discipline, I managed to put *Picture Puzzles* aside after a mere 30 minutes, leaving ample time to get my thoughts down on paper — or rather, onscreen. As you may have noticed, I found *Picture Puzzles* to be quite addictive!

On startup it asks you what type of monitor you have (RGB or composite) and then presents a menu of 10 different puzzles, including circles, squares, stars and "abstracts." After you select a puzzle, another menu is displayed, which allows you to select which of the three modes of play you want to use.

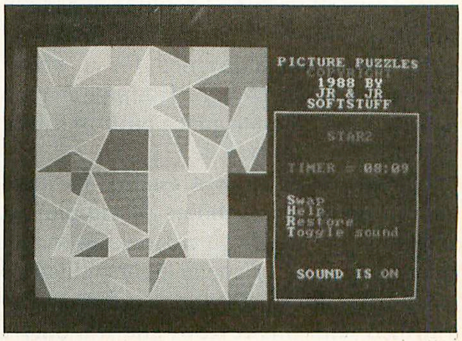
In the first play mode, you set a time limit (from one to 15 minutes) for solving the puzzle. I got toasted in this mode every time, and abandoned it after the first night.

Mode 2 enables you to set a move limit, from 100 to 1000, in steps of 25. I did better here, but found it so agonizing to make 1000 moves and then *lose* that I gave up on this one, too.

The third mode is for me. It gives you limitless play, and simply counts the number of moves you take to solve the puzzle. My best effort was 317 moves for the square. One of the abstracts was my worst nemesis. I don't recall precisely the number of moves I needed, but it exceeded my best score by more than a factor of 10!

Once you enter the desired mode, the puzzle is displayed. Pressing ENTER scrambles the picture, and you are under way. Reassembling the puzzle is not easy, but you can ask for help as often as you like. When you do, the program highlights the next tile to be positioned, assuming you are assembling them from left to right, beginning with the upper-left tile. If you are not using this approach, the Help function is not nearly as useful. There is also a penalty for asking for help. In a timed game (Mode 1), asking for help costs 10 seconds and in the other two modes adds 25 moves to your total.

In addition to the help function, a swap command can be used once per puzzle to interchange the position of two adjacent tiles. It is usually possible, with some determined manipulation, to complete the puzzle without using this feature; being notoriously stubborn about such things, I made it a rule not to use it at all. On that one abstract, though, I finally resorted to a swap after more than 3200 moves. I might still be working on it if I hadn't!



Should you totally lose hope, the Restore command puts the puzzle back together again and returns you to the main menu.

In addition to being oodles of fun, *Picture Puzzles* is an exemplary bit of programming. The puzzles are bright and colorful, and with 10 to choose from there is sufficient variety to keep the game from getting repetitive. The movement of the tiles is smooth, and they do not move either so quickly or so slowly as to be distracting. The sound effects are well-blended. The noise of a sliding tile can be turned off, but it's one of those "appropriate" sounds, and I never felt inclined to squelch it. The "hoopla" when you solve a puzzle is sufficiently gratifying without forcing you to sit through a long reward sequence.

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The documentation for this package is very clear and complete, and it even includes screen dumps of all the puzzles should you need additional help in solving them. The disk is non-protected and carries a one-year warranty against defects.

The only annoying facet of *Picture Puzzles* is the lack of a joystick interface. After several hours of using arrow keys, I found myself wishing I could lean back in my chair, prop my feet up on my desk, and push tiles with a joystick for a while. Instead, I went to bed. Hmmm, maybe what we have here is just a built-in safety feature!

Picture Puzzles is a quality package that provides many hours of simple yet challenging fun. If you are looking for yet another reason to spend hours glued to your CoCo, look no further! As for me, I'm finished with this review, and it's only a few minutes past midnight — plenty of time for one or two more games....

(JR & JR Softstuff, P.O. Box 118, Lompoc, CA 93438, 805-735-3889; $19.95 + $3 S/H)

—Jim K. Issel

Software CoCo 3 & OS-9 Level II

Ironsides and Crimson Sails— Fire a Broadside at the Enemy

It is a quiet, sunny day in Sao Luis. The harbor is waking to morning activities; the ships creak quietly at anchor. Suddenly, a lookout from the top of a mast calls out, "Crimson Sails, Crimson Sails!"

Bleary-eyed Commander of the Sao Luis Fleet, you step from your cabin and squint out into the morning haze past the island's rocky outcrops. There! Out past the breakers! No less then 11 four-masters are poised for attack! Rubbing the sleep from your eyes, you shout for the quartermaster to sound the alarm as you hurry to prepare for the battle that will determine the fate of Sao Luis.

Ironsides and Crimson Sails from Softwar Technologies is a two-player game for the 512K Color Computer 3 running OS-9 Level II. Each player assumes the role of commander — one player commands the fleet of attacking crimson ships, and the other commands a defending black fleet of ships. If yours are the crimson ships, your goal is to occupy the home port being defended by the black ships. If you are heading the black ships, or "Ironsides," it is your job to sink all of the Crimson Sails. It is possible to tie the game: Each opponent may be able sink all of the other's ships.

Single players can attempt to play the game for both sides, but this would be for practice only to learn the strategy of the game. There are several nice features. *Ironsides and Crimson Sails* has context-sensitive help windows that pop up if you press the wrong key. There is also online help available that lists complete game rules and commands at the press of the question mark (?) key. A game save and load feature also is available from anywhere in the game. It's a good idea to print out the help file so that you can have a hard copy of the directions, because the only "hard-copy" instructions that come with the game consist of a single page on loading and setting up.

Most of the setup is automated, so you really don't need to know anything about OS-9 to run *Ironsides*. Just follow the directions on the sheet, and you shouldn't encounter any problems. A note of caution — after the game loads and displays its banner screen, the display will become blank and you'll hear beeping for about 15 seconds while the game is initialized. This is normal, and in a few seconds the description of the battle will appear, and then play begins. RGB monitor users, remember to set `MONTYPE RGB` or you will get false colors on the screen.

Ironsides and Crimson Sails comes with five completely different naval battle scenarios, and five different maps, as well. This game will not overwhelm you with dazzling graphics. While the map setup is crisp and clear, particularly on an RGB monitor, it has limited, non-animated graphic representations of a map screen with the red and black ships on it. The sound is limited to a soft beep when the game loads and initializes and when a key is pressed. The action is limited to ships traveling in a straight line, sails disappearing, (each ship has four initially, which are lost by combat, storms, serpents or rocks) a storm moving through, and serpents squirming around. This is a strategy game first and foremost. In spite of the limited graphics and sound, the game is engaging, and can be very challenging and absorbing. It can get downright exciting from time to time if you have a challenging opponent.

In addition to the five scenarios that accompany *Ironsides and Crimson Sails*, Softwar Technologies is also offering scenario disks. The disks cost $8.95 each, and each contain eight additional scenarios. Currently being offered are *Greek and Roman Sea Conflicts*, *Battles of the British Fleet*, *American Sea Battles 1775-1895*, *Sea Battles of the Civil War* and mythical and fantasy-based battles. Each battle has its own descriptive page to set the stage for the given battle. Each battle involves completely different situations and requires completely different strategies. The game play is straightforward, but the strategy can be difficult to master. All in all, *Ironsides and Crimson Sails* gives a good basic simulation of combat between sailing vessels. At $8.95 it is an excellent value.

(Softwar Technologies, Ameritrust Building, 17140 Lorain Avenue, Cleveland, OH 44111, 216-251-8085; $8.95: First product review for this company appearing in THE RAINBOW.)

—Jeffrey S. Parker

Software CoCo 1, 2 & 3

Tetris— From Russia, With Love

Put down your weapons! *Tetris*, the "Soviet Challenge," is a non-violent, challenging game of strategy and skill that so far just might be the best thing to come out of glasnost. Yes, it originated in Russia, invented by computer researcher Alexi Paszitnov and programmed by student Vagim Gerasimov. From their computers to your CoCo it has gone through five companies — one Soviet, one British and three American. Plug the cartridge into your 32K or greater CoCo — you don't need a disk drive for this one — and let's go!

> *"If the Communists were plotting to take over the world (at least in the software field), they succeeded with* Tetris. *It is* very *addictive."*

Tetris at first seems ridiculously simple, but its complexity will amaze you. It is an addictive "thinkers" game that will stretch your spacial abilities. You cannot "win" at

Tetris, for the game has no ending — it just keeps going for as long as you can keep up.

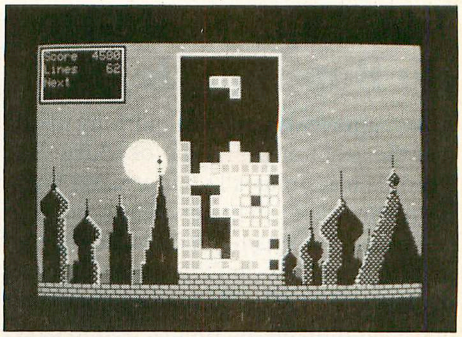
On the game screen there is a rectangular black "pit." Pieces composed of four blocks (*tetra* meaning "four") fall from the top of the screen into the pit. It is your job to fill it with these symmetrical and asymmetrical pieces in such a way that you create solid rows, leaving no gaps: You can move the pieces left and right and rotate them in 90-degree increments. When you have formed a solid row, that row disappears, and the unfinished row above drops to fill its place. If you let the pieces pile up all the way to the top of the screen, the game is over.

As long as you can keep filling rows, the pieces will keep dropping. But the better you get, the faster they fall. Your score is based on how many pieces fall into the pit and how many lines are cleared. So, of course, the strategy is to keep clearing out the blocks at the bottom so that there is room for more to fall. You must plan your strategy ahead — making the best possible move for the moment may not be the best in the long run. After the title screen (and between games) there is a demo that's truly fascinating, even hypnotic! It's instructional, too; beginners would do well to study the technique.

Tetris actually comes in two versions, both of which are included in the ROM pack: one for 32K CoCos 1 and 2, and one for the CoCo 3. It knows what kind of CoCo it's been plugged into. For the CoCo 3 there is an RGB/composite option. User interaction is via the keyboard or a joystick, but the joystick operation is awkward. There are 10 skill levels, which are based on speed. With keyboard operation, the J and L keys are used to move pieces left and right, and the K key is for rotation. Both the comma (,) key and the space bar can be used to drop a piece if you're in a hurry. The arrow keys can also be used for the J, K, L and comma pieces. If you're in a really big hurry, pressing the I key will advance you to the next higher (faster) level. Levels under 5 are rather slow, but Level 9 really whizzes! If the phone rings, press the BREAK key to pause.

CoCo 3 users have extra options in that they can call up a help menu and statistic and level displays. One option any CoCo user can take advantage of is the "Next" feature. "Next" will display the next piece to fall, before it's on the screen. This gives you a little time to plan your strategy, but the down side is that it also affects scoring — negatively.

Tetris is a fun game that a single player or the whole family should enjoy and consider well worth having. Actually, it's a good game to teach children shape perception as well as coordination.



If the Communists were plotting to take over the world (at least in the software field), they succeeded with *Tetris*. It is *very* addictive. So just make very, very sure, if you buy *Tetris*, that you have nothing better to do, that your job is not tied in any way to national security, that you don't have to eat or sleep....

(Spectrum HoloByte, dist. by the Tandy Corporation, 1700 One Tandy Center, Fort Worth, TX 76102; $29.95: Available in Radio Shack stores nationwide.)

—Audrey DeLisle

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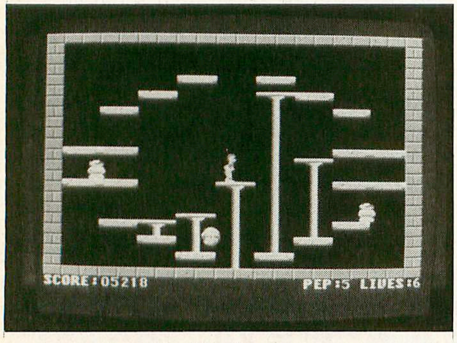
Software CoCo 3

Rupert Rythym— Tap, Tap, Do-Do-Do-Do Bop Bap Hey!

Imagine waking up one morning to find that the scheming manager of Music Box Records has stolen all your original musical manuscripts and plans to release *your* songs under *his* name! You must get your manuscripts back, but this means entering the Music Box Records building after hours and searching all the rooms. Sound easy? It would be a snap, crackle and pop if it weren't for the building's night-time staff of roaming security robots, eternally vigilant and ever ready to put a swift end to an honest intruder's quest. And then there are all those crazy elevators....



A musician's life is not an easy one in *Rupert Rythym*, an arcade-style action game for one player. (Yes, *Rythym*. The programmer, Nickolas Marentes, is an Aussie; apparently that's the way they spell the word Down Under.) To play you'll need a CoCo 3 with a disk drive and a joystick (you'll definitely want to use a joystick rather than a mouse). *Rupert Rythym* can easily be configured for a composite monitor, but you'll need an RGB color monitor to really appreciate the program's quality and 16-color graphics. And then there's the sound: real, digitized percussion sounds that will have you thinking your CoCo has turned into a rocking rhythm machine.

With a simple `LOADM"RUPERT"`, the all-machine-language, copy-protected program boots quickly. There is a 90-day warranty offering free replacement of a failed disk; after that a replacement disk will cost $3.50.

Once *Rupert Rythym* is running you are greeted by a sharp-looking title screen. You are also treated to the cleverly orchestrated percussion sounds of *Rupert Rythym*'s humorous opening theme (*Tap, Tap, Do-Do-Do-Do Bop Bap Hey!* The "Hey!" is a digitized voice). When you've heard enough, you can begin game play with a simple click of the joystick button.

Upon entering the world of *Rupert Rythym* you'll find yourself in Music Box Record's "Master Hall" with 16 doors to choose from. Rupert's "world" is basically a high-quality, two-dimensional game grid; Rupert can move left or right and up or down, but there is no third dimension, i.e., Rupert cannot move toward or away from the screen. With another click of the joystick button you can enter any of the 16 rooms from the Master Hall.

Each of the 16 rooms consists of a series of suspended platforms, all interconnected by automated elevators. Each room has a different configuration of platforms. You move your alter ego, "Rupert," about the rooms with your joystick, making short jumps from platform to platform and riding the elevators to the more inaccessible levels. But you must be careful: A careless step will send Rupert into a fatal free-fall to the bottom of the screen.

The goal of *Rupert Rythym* is to enter each of Music Box Records' 16 rooms, walk upon all of the platforms and collect all 16 of Rupert's stolen music manuscripts. The manuscripts are actually individual segments of a complete, digitized "rhythm" percussion concert. Once you've collected all 16 rhythm segments — and assuming Rupert is still alive and rapping — you must arrange them in their proper playing order. When all the rhythm segments are correctly ordered, Rupert then leaves the Master Hall and performs a unique concert (randomized for each game), which is accompanied by a graphic display. Points are awarded based upon the number of rooms toured and how long it takes you to play the game.

Of course, as I'm sure you've guessed, rounding up all those rhythm segments requires more than a simple soft-shoe performance. While you must be careful not to let Rupert fall off the edge of a platform or elevator, you must also avoid encounters with the lurking security robots; meet cheek-to-cheek with one of them and it's "Taps" for Rupert. Fortunately, Rupert has nine lives, so he is allowed a few missteps. Luckily, too, Rupert is not without defenses; a supply of firecrackers and pep pills, used effectively, can ward off even the most menacing of robot assaults.

From the opening title screen to little Rupert and his firecrackers, I was very impressed with the quality of the graphics and animation. The graphics are a pleasure to watch, and I particularly appreciated the smooth scene transitions that would, for example, make the title screen appear to cross-dissolve into the game screen (involving, among other things, some clever palette manipulation). The high-quality sound was very nicely married to the graphics, each enhancing the other. I found the joystick controls had a good, intuitive feel, and there was no need to be constantly returning to the keyboard during play. There is a pause option, and it is very easy to abort and restart the game at any time. On the surface, *Rupert Rythym* is a really smooth production.

I enjoyed *Rupert Rythym* for its look, sound and ease of use, but what I missed was more variety and a sense of immediate reward. While each of *Rupert Rythym*'s 16 rooms is unique, there is only a total of 16 different platform layouts in all (not counting the single platform layout in the Master Hall), and the different layouts are just distributed randomly among the rooms with each start of the game. Basically, *Rupert Rythym* offers 16 similar puzzles to solve (requiring some note-taking, as well). The focus is on strategy as much as on arcade skills.

A choice of skill levels, or an option to save a partially completed game to disk, would have added some flexibility.

Even though it could use some variety, *Rupert Rythym* offers fine graphics, some entertaining challenges and the funkiest sound I've ever heard come out of a CoCo.

(Game Point Software, P.O. Box 6907, Burbank, CA 91510, 818-566-3571; $24.95 plus $3 S/H for tape or disk)

—Walter Myers

Book

Start OS-9— A Painless Introduction to the Power Environment

Probably one of the major reasons CoCo users tend to shy away from OS-9 is the rather formidable technical manual that comes with the Level II version. This coupled with the nice, friendly environment of Disk BASIC leads one to the conclusion — "Why bother?" Being an OS-9 user since its first appearance in 1983, I can tell you that it is definitely worth the effort. One of the major problems in learning OS-9 is the limited amount of books available (especially as compared to the volumes for MS-DOS). The books available are excellent, but tend to cater more to an intermediate level. Paul Ward of Kenneth-Leigh Enterprises has just published a book, *Start OS-9: An Enjoyable Hands-On Guide to OS-9 on the Color Computer 3*, which addresses the new user with a CoCo 3 and OS-9 Level II.

Start OS-9 is written in tutorial style and includes a disk of several utilities that were written by Stephen Goldberg, who has contributed a number of utilities to the "KISSable OS-9" column in THE RAINBOW. The book is in 8 1/2-by-11 format and is bound with a plastic spiral binder that allows the book to lie flat next to the computer, making it easy to work through the tutorials. Included in the book are 10 tutorials plus explanatory material, as well as several very interesting appendices.

The material covered in the book is organized into 14 chapters, which are set up in such a way that the reader can work on a chapter a day and complete the "course" in two weeks. I'm sure that some will be able to go faster, while others will take their time. The book contains good descriptions of the OS-9 modules that create the operating system. Ward's discussion of this material is presented at a basic level, making it interesting reading for the new user. Other chapters include discussions on the following: making new system boots; command syntax; paths and directories; creating, renaming and deleting directories; printer setup; basics of the OS-9 line editor; merging files; loading and unloading executable modules in memory; customizing the startup file; redirection and pipes; and of course, windows. These are but a few of the topics that are covered. All of the material is presented at the beginner's level and is sufficient to give the new user a well-rounded foundation in OS-9.

Seven appendices are included in the book. These are written by well-known authors who appear in the pages of THE RAINBOW. Included in the appendices are the topics Hardware for the CoCo by Marty Goodman, Telecomputing by William Brady, Hard Drive Systems by Kevin Darling, BASIC09 by Dale Puckett, Utilities by Stephen Goldberg, and Music by Paul Ward.

The utilities provided with *Start OS-9* are quite useful and illustrate the power and modularity of OS-9. Several of these utilities are used in the book in conjunction with the development of a phone list database. The utilities include the following: `Cls` — clears the screen; `Copy` — a revision of the Tandy `copy` command that allows overwriting of an existing file; `Count` — gives a count of the number of characters, words and lines in a file; `D` — provides an unformatted list of files in a directory (useful with pipes); `GRep` — a pattern-searching utility; `Sort` — an in-memory ASCII file-sorting routine; and `Uniq` — a utility that deletes repetitive entries from sorted lists. In addition, the disk contains modules to create a RAM disk. Finally, some shell scripts are provided to illustrate how to set up various types of windows. The disk also contains files necessary for several of the tutorials.

Overall, the book is well-written and is an excellent beginners resource. The software included provides the new user with some applications commands that demonstrate the ease of using OS-9 as well as the power of the operating system. There are a number of typos in the book, as well as some bad sentence structure; however, the author indicates that these have been corrected in the soon-to-be-released second edition. Two additional appendices were planned but did not make it to the first edition; these were on compact disc interaction and bootlists. Owners of the first edition may upgrade for the cost of $10. I definitely recommend this book to new users and perhaps those not so new.

(Kenneth-Leigh Enterprises, 1840 Biltmore St. NW, Suite 10, Washington, D.C. 20009, 202-232-4246; $32.95 plus $2.50 S/H: First product review for this company appearing in THE RAINBOW.)

—Donald D. Dollberg

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Received and Certified

The following products have recently been received by THE RAINBOW, examined by our magazine staff and issued the Rainbow Seal of Certification, your assurance that we have seen the product and have ascertained that it

Caladuril II: Weatherstone's End, a CoCo 3 sequel to the Adventure *Caladuril Flame of Light*. Monstrous storms threaten King Jamerend's valley, and the court sages send his young son, Olin, on a quest to determine the reason. But Olin is waylaid and finds himself on an unfamiliar shore in a land that is held by the enemy. A 100-percent machine-language program, the game supports 16-color graphics on the CoCo 3. It comes on a two-disk set and includes a map and a 20-page manual. *Oblique Triad, 32 Church St., Georgetown, Ontario, Canada L7G 2A7, (416) 877-8149; $32 US, $38 Cdn.*

◆ **Chess Made Easy**, a menu-driven chess tutorial for the CoCo 3. The program includes seven individual lessons: Chessboard identifies the squares on the board; Chessmen shows how the pieces are moved; Notation teaches you how to record your moves for later review; Playing the Game covers the rules of chess and setting up the chessboard; Chess Opening provides instructions for developing your pieces in preparation for the Middle Game; Middle Game exploits the weaknesses of your opponents; and The End Game explains a Checkmate and Coup-de-grace. Requires a CoCo 3 and a disk drive. *CoCo Chess/Ware, P.O. Box 542, Starkville, MS 39759, Contact Donald Villiard at (601) 323-9081; $20.*

Disk Doctor, a disk utility designed for use with Burke & Burke's *Hyper-I/O*. It allows the user to check a specified device for bad sectors. If a bad sector is found, the user has the option of blocking out the granule relating to that sector in the GAT. Included is a provision for printing a hard copy of trouble spots on the device. Requires 64K and *Hyper-I/O*. For the CoCo 1, 2 and 3. *KB Enterprises, 435 Brightwaters Drive, Cocoa Beach, FL 32931, (407) 799-3253; $17.95 plus $1.50 S/H.*

Hard Drive Utilities 2.0, an upgrade of the hard disk drive utility designed for use with Burke and Burke's *Hyper-I/O*. It will back up device to device and hard drive to disk, select files for operation, search for filenames and restore the hard drive to and from the disk. Requires 64K and *Hyper-I/O*. For the CoCo 1, 2 and 3. *KB Enterprises, 435 Brightwaters Drive, Cocoa Beach, FL 32931, (407) 799-3253; $21.95 plus $1.50 S/H.*

Hard Drive Zap, a disk zap utility designed for use with Burke & Burke's *Hyper-I/O*. It includes a seven-page tutorial on various file recovery techniques and allows the user to: move to any section on the device or a specific track or sector directly; move around the current sector being accessed and modify the data in it; write out a modified sector to the device; list a device directory to the screen or printer; access the GAT and view the entire sector in hexadecimal format; print the data of the current sector in ASCII format; and switch to another device within the program. Requires 64K and *Hyper-I/O*. For the CoCo 1, 2 and 3. *KB Enterprises, 435 Brightwaters Drive, Cocoa Beach, FL 32931, (407) 799-3253; $21.95 plus $1.50 S/H.*

Lock Master, a disk utility that allows you to lock your disks with or without a password so that no directory entries can be seen. It locks the DOS track and the directory, so that programs loaded using the `DOS` command no longer function and an attempted save to disk will be thwarted with a DF (Disk Full) Error. For the CoCo 1, 2 and 3. *Right Brothers Software, 1173 Niagara Street, Denver, CO 80220; $14.95 plus $2 S/H.*

Notes, a menu-driven music editor for the CoCo 2 and 3 that allows you to write and edit musical notation, including orchestral and solo parts or scores, and print eight lines of music per page on a dot-matrix printer. (Not suitable for piano copy.) *Robert Pori, 137 Wingfoot Court, Aptos, CA 95003, (408) 688-0115; $45.*

Roots, a machine language source file containing over 100 subroutines to add to your own programs. The package includes `FONT.DAT`, which allows you to send characters to the screen or printer, read and write sectors to disk, convert registers into ASCII numbers, generate random numbers, put ASCII characters on Hi-Res screens, read joysticks, input strings and numbers, etc. Uses the extra keys, speed, graphics and memory of the CoCo 3. For the CoCo 1, 2 and 3. *GSW Software 8345 Glenwood, Overland Park, KS 66212; $25, disk only.*

R.S.B. V. 1.2, an upgrade of the OS-9 program that emulates the Disk BASIC environment. New features include support for basic programs as large as 32K, support for auto-line-feed printers, and revised `PALETTE` and `CLS` commands that match Disk BASIC operation more closely. Requires a CoCo 3 and OS-9 Level II. *Burke & Burke, P.O. Box 1283, Palatine, IL 60078, (312) 397-2898; $39.95.*

VIP Calc III, an update of the *VIP* spreadsheet that's been written for the CoCo 3. A worksheet with up to 512 columns and 1024 rows can be drawn, and 16 windows can be called up for comparisons. Features include block functions, sorts, programmable functions, algebraic and trig functions, and eight- and 16-digit precision. On disk for the CoCo 3. *SD Enterprises, P.O. Box 1233, Gresham, OR 97030, (503) 663-2865; $69.95.*

◆ **First product received from this company**

The *Seal of Certification* is open to all manufacturers of products for the Tandy Color Computer, regardless of whether they advertise in THE RAINBOW.

By awarding a *Seal*, the magazine certifies the program does *exist* — that we have examined it and have a sample copy — but this *does not* constitute any guarantee of satisfaction. As soon as possible, these hardware or software items will be forwarded to THE RAINBOW reviewers for evaluation.

—Lauren Willoughby

RAINBOWTECH

Barden's Buffer

16K ECB

It's April again, and you know what that brings — fools in computers and fools in love.

April Foolishness and Pentomino Contest Winners

By William Barden, Jr.
Rainbow Contributing Editor

In keeping with the first part of the month I'm going to present some recent questions received in THE RAINBOW mailbag — a potpourri of hardware, software and operational queries. The second part of this column announces the winners of the Pentomino Contest and shares some interesting correspondence regarding pentominoes. First, the Q&A . . .

April's Questions and Answers

I recently went to my Radio Shack store and told the salesman that I was looking for an inexpensive, capable computer system with an operating system similar to Xenix, lots of game-oriented software, and inexpensive, powerful peripherals that could be used with it. Oh, yes, I told him that it must have a Motorola microprocessor — something like the 6800, but better. He told me that a Tandy 3000 with a Tandy laser printer was just what I needed and guided me toward the front of the store. On the way, I stumbled over a box marked "Color Computer 3." On inspection, it seemed to be just what I was looking for and I bought it over the saleman's objections. Did I make a mistake?

— Puzzled in Omaha

Dear Puzzled:

The CoCo 3 has an entry-level price of about one-fifth that of an MS-DOS system, a great variety of inexpensive software and hardware available for it, a sophisticated operating system called OS-9 for a very reasonable cost, and a powerful 6809 microprocessor. In spite of those factors, however, the CoCo 3 is probably not a bad system, and you may be happy with it. Let me know how this turns out.

Bill Barden has written 27 books and over 100 magazine articles on various computer topics. His 20 years' experience in the industry covers a wide background: programming, systems analysis and managing projects for computers ranging from mainframes to micros.

I keep reading not only about the CoCo 1, 2 and 3 systems, but various revision boards as well. What's the straight story on this?

— Too Many Revisions

Dear Too Many:

The original CoCo 1 was first introduced in 1946 when Radio Shack was selling through Allied radio in Chicago. Far ahead of its time, the system prompted many returns with refunds after irate customers found they could not receive The BBC Overseas Service, Radio Netherlands or Voice of America on the package. Radio Shack put the system on ice.

In 1980 the CoCo 1 was reintroduced and became an overnight success. By this time Radio Shack had retrofitted the system to include short wave circuitry.

Early versions of the CoCo 1 were assembled in Fort Worth by a work force of itinerant rodeo performers. If you can obtain these early systems (they are now collector's items), you will see the signatures of many of the original fabricators etched inside the case in the plastic — names like Billy Joe Bob Eikens, Bobby Joe Bob Calkins, Freddy Joe Bob Smith, and Lester Caxton Grunwald-Smyth, III.

Later versions of the CoCo 1 were manufactured in the Orient. The Model A revision board corrected a minor flaw in the circuitry — not being able to write text characters to the screen. The Model A revision was followed by revisions B through MN, each correcting minor flaws and reducing the chip count to lower the expense.

The CoCo 2 brought a new keyboard to replace the "chiclet"- style keys of the CoCo 1, made out of dessicated, molded Central American gum. By this time Radio Shack had fine-tuned the CoCo and reduced the board revisions over the life of the CoCo 2 to only revisions A through Q.

The CoCo 3 brought 640-by-192 graphics and 512K of memory. Always looking for low-cost solutions, Radio Shack had incorporated all of the CoCo logic into one humongous chip — the so-called GIMEDOLLAH chip. The CoCo 3 system currently has only one board revision, but 32 revisions to the GIMEDOLLAH chip itself, revisions A through AF. Also by this time, manufacturing had reverted to the United States, where labor was less expensive than in the Orient.

I hope this answers your question.

I like "Barden's Buffer", but find many of your program descriptions long-winded and overly complex. For example, in the November issue, you discuss several sorts. Could you explain in simple terms how the Quick Sort works?

— Tired of Complexity

Certainly, Tired:

I looked over the column and it *did* read tediously. Here's a new writeup on the Quick Sort:

"The Quick Sort is a recursive sort that partitions each file into right and left subfiles in such a way that the new partitions have reduced the original sorting problem to two simpler partitions that can now be recursively processed by a call to the Quick Sort subprogram again, applying the same sorting technique to the two component parts until they are sorted by the same method, but with the usual tests for completion of recursion, in this case being a test that two pointers (one to the right and one to the left partition) have not crossed — an indication that the partition has been successfully sorted."

I think that will make things more lucid for you.

I like Tony DiStefano's "Turn of the Screw" column, but am awed by the complicated circuitry required. Aren't there simpler circuits?

— Tired of Complexity

Dear Tired:

Haven't we met before? Tony has some new beginner's projects coming up that are perfect. I saw a preview of one of them — a simple CoCo interface to a research hospital PET scanner. It requires less than 2000 discrete components, most of which are available at any Radio Shack store.

What are the advantages of OS-9 RS DOS (Disk Extended Color BASIC)?

— Perplexed in Pittsburgh

Dear Perp:

None that I can see. I asked Dale Puckett about this and he admitted that as well.

Is there any way to convert my 1961 17-inch Packard Bell black-and-white television for use on my CoCo 3 in 640-by-192 color mode?

For this question we'll defer to RAINBOW's television and monitor expert, Marty Goodman:

"You haven't given me enough data to go on! I don't know from your desription whether you have the Packard Bell 17CRG set or the Packard Bell 17CRM set. It's *very* difficult to answer questions of this type without having *all* the facts. However, let me try.

If your set has a 1000 ohm, ½-watt resistor in Location M23 of the flyback transformer casing, chances are it's a 17CRG. Otherwise it's probably a 17CRM. If your set is a 17CRG, carefully remove the flyback transformer casing. You will see a connector underneath the rear edge labeled "Color Connector." Insert a Color VDG chip (sold by many RAINBOW advertisers, or available from Radio Shack National Parts) into the connector and bend back Pin 24. Using rainbow cable, connect pins 1 through 23 of the Color VDG chip to the corresponding pins of the RGB connector on the CoCo 3. Replace the flyback transformer casing. You should now see full color on your Packard Bell.

If your set is a 17CRM, I would not recommend modification of the set. It is simply not reasonable to do so — the modifications would far exceed the cost of a CM-8 monitor. You must get such a monitor if you want high-resolution color for CoCo 3."

Thanks, Marty.

I am an 11-year-old boy very interested in computers. I have built my own Color Computer 2 from scrap parts found in the dumpster in back of the Radio Shack store in my neighborhood. I used a car battery to program an old PROM. It works fine. I want to use the Color Computer 2 to do a science fair project on care of the aged by computer. But I have a problem. I can't locate the EDTASM assembler anywhere. I need to do the program in assembly language because that's what I do best. Can you help me? (I think I can win the science fair scholarship if I can get this working).

— Donny

Dear Donny:

Sorry to have to tell you this, but federal law prohibits copying software such as *EDTASM*. This column simply cannot condone such activity and I would suggest that unless you can *buy* a copy of *EDTASM* that you pick another project!

Where can I find graphics pictures that I can display on the screen of my CoCo 3?

— Visual Vick

Dear VV:

Try using Delphi and the Color Computer Special Interest Group (SIG). Here's a sample of what's currently offered:

GIRLS11	Eleven 640-by-192 pictures from the swimsuit issue of RAINBOW
SPACESH	Five pictures of the space shuttle
MICKEY	Two pictures of Mickey and Minnie
ROACH	Three pictures of Tandy's John Roach and Minnie
NUDES23	Twenty-three high-resolution pictures showing Brooke Shields, Jessica Hahn and playmates
COWBOYC	Thirteen pictures of the Dallas Cowboy cheerleaders
XRATED	Back view of Microware developers
XXRATED	Three high-resolution, colored pictures of a Revision B board of the Color Computer 2 from various angles
XXXRATED	Front view of an Apple Macintosh

There are many more pictures that can be downloaded, but don't expect renditions from the Louvre, VV.

First we had the Color Computer 1, then the Color Computer 2, then the Color Computer 3. I'm eagerly awaiting what's going to happen next. Have you heard any rumors?

— Anxious

Dear Anxious:

As a matter of fact, I have. I was down in Fort Worth not too long ago, and here's what I heard: The new CoCo 4 will dispense with a keyboard and add two more joysticks. The Shack felt that the keyboard was a needless frill — their surveys show that only 2 percent of the CoCo users — about 100,000 people — actually use the keyboard. The remainder simply plug in cartridges. As a result, the new CoCo 4 will have an additional cartridge slot. Because of the high royalty rates paid to Microsoft and Microware, the new CoCo 4 will do away with both Microsoft BASIC and OS-9. A new operating system from Digital Research, CP-MC, will be used in its place. Available languages are FORTRAN, COBOL and JOVIAL. Source code will have to be ported to the CoCo 4 through the RS-232-C interface. Sounds like an interesting system and I can hardly wait!

I'm a 78-year old great-grandfather of 46 who's just getting interested in computers. Although I have a scientific background (PhD in physics, Nobel Laureate) I'm just wondering if I'll be able to learn anything about this new-fangled technology. Do you think CoCo computing is a good hobby to get into? Will I be able to pick any of this up?

— Zachary

Dear Zach:
No.

I've read a lot about clock speed-up for the CoCo 2 and 3. What is the maximum clock rate at which the CoCo can run?

— Speed Demon

Dear Speedy:

Although you can double the clock rate of the CoCo 2 and 3 by pokes, it's a little-known fact that you can actually get an effective clock rate of 144 MHz — hundreds of times faster than normal — by using an external clock generator and feeding it into the 6809B chip. At least one CoCo advertiser, Darn Fast of Pudd, Wyoming, sells a kit for this ($59.95, 152 pounds with waveguides, shipped rail freight). The down side is that not too many programs, including RS DOS, will run with the upgrade.

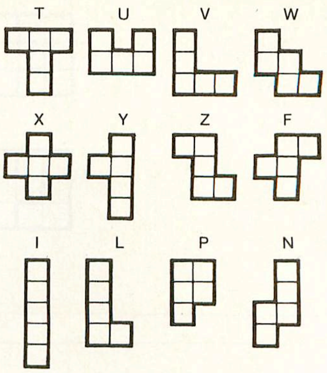

Figure 1: The 12 Pentominoes

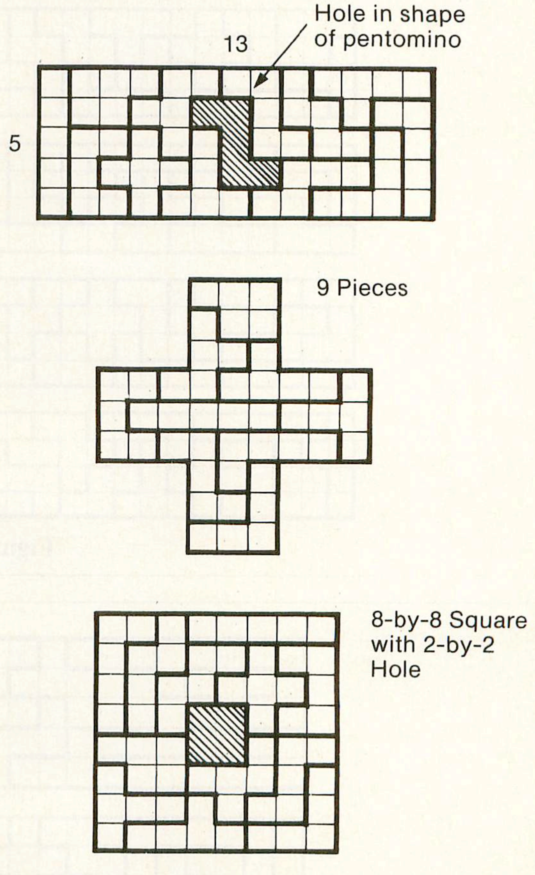

Figure 2: Other Pentomino Problems

The Puzzling Pentominoes

In the December '88 issue of RAINBOW, I proposed a contest to see how many readers could figure out how to construct 3-by-20, 4-by-15, 5-by-12 and 6-by-10 blocks out of 12 figures called *pentominoes*, shown in Figure 1. I also provided a program that would allow you to move the figures around on the screen. The program was written for the CoCo 3 to take advantage of the computer's colors and high-resolution screen. In retrospect, I really should have provided versions for CoCo 1 and 2 users, although I thought that those readers who were interested might cut the figures out of cardboard

In fact, many readers did use manual methods for this, although some keyed in the program and used that. In this month's column I'll name the winners of the Pentomino Contest. Grand Prize for the contest, as you recall, was $M 50,000,000, where the "$M" stands for Microdollars, a standard unit of currency used for the CoCo series worth (at this time of writing, although the Microdollar is weakening...) one-millionth of a U.S. dollar.

Reader Response

Dr. Norm Barson of East Brunswick, New Jersey was kind enough to send a thick volume of pentomino configurations he has done over the years. It includes the two answers to the 3-by-20 puzzle, six answers to the 4-by-15 puzzle, 17 answers to the 5-by-12 puzzle, and several hundred answers to the 6-by-10 puzzle. There are also pentomino puzzles relating to shapes other than rectangles that can be made (a few are shown in Figure 2) and Dr. Barson sent some of those as well. Dr. Barson is a man after my own heart — wiling away countless hours on puzzles such as this, just because . . . well . . . they're there.

I also got a nice letter from Arthur Hallock of Deming, New Mexico. Arthur included, as did Dr. Barson, a reference to a program first done in May, 1984 by Jim Butterfield. This BASIC program runs through all possible combinations of pentominoes to solve the 3-by-20, 4-by-15, 5-by-12 and 6-by-10 puzzles. I obtained a copy of the program and ran it. It

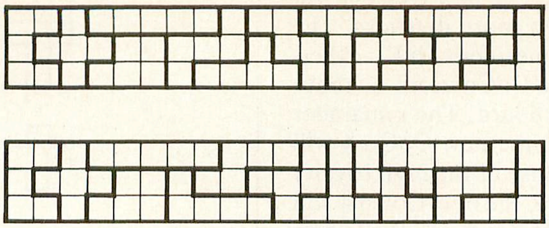

Figure 3: 3-by-20 Solutions

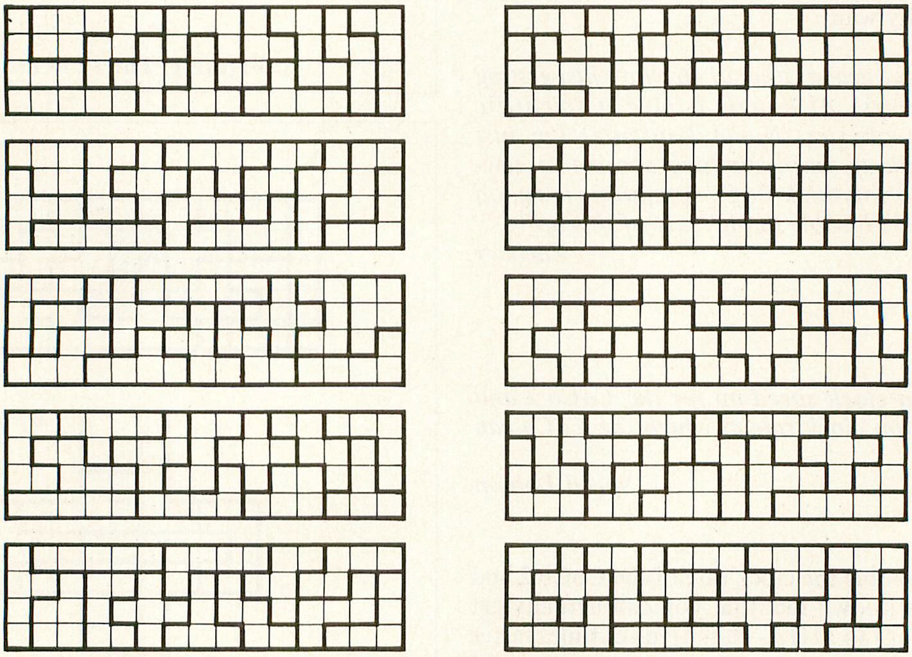

Figure 4: 4-by-15 Solutions

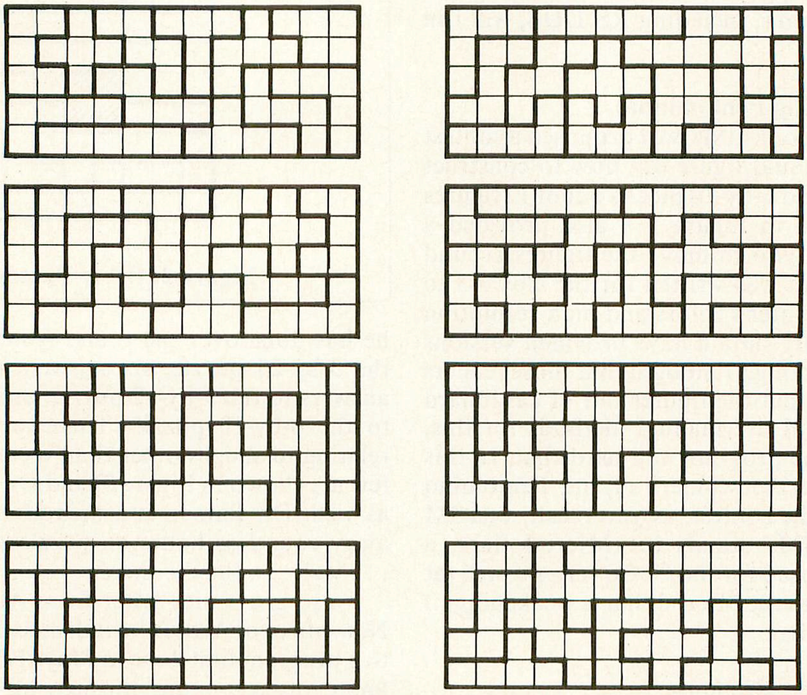

Figure 5: 5-by-12 Solutions

uses the CoCo text screen and displays the individual pentominoes as text characters. A typical display is:

```
IVVVWW
IVTWWX
IVTWXXX  ...
ITTTLXY
ILLLLYYYY
```

You can see how the pentominoes are made up of the same letters as their names. The program arbitrarily starts with a single pentomino, then tries another pentomino that fits, and then keeps trying pentominoes until either successful or unsuccessful. If unsuccessful, it "backs up" to try any remaining pentominoes. The program works very well, but is somewhat slow. As Norm Barson says, "I once left my CoCo running continuously for over two weeks to get these solutions and they all still had the same piece ('I') in the upper-lefthand corner."

Tim Cummings of Palmdale used some valid and interesting logic to solve the 3-by-20 puzzle, finding out which pentominoes were limited in position and working on from there. Here are some other interesting comments from readers:

"After working five solid hours . . . I just could not give up." Edd Hollingsworth

"I have found three solutions. . . ." Marc-Antoine Chabot

"I used paper cutouts of the 12 pentominoes and transcribed them to arrays." Gregory W. Long

"I had never heard of pentominoes before and now I am virtually hooked on them. . . ." Buel R. Thomasson

"After three days of tearing my hair out . . ." Brian Davidson

"After all, how hard could a puzzle with only 12 pieces be to work. . . . Boy, was I surprised!" Lee Walker

"What a relief after two weeks at 1½ hours per day, to see the grid flash . . . Fun!" James Posporelis

"Not having seen your pentomino puzzle before, I figured I'd spend a few minutes playing with them. After all, how difficult could it be?" George Aftamonow

"The puzzle took me about 20 minutes, but I attribute most of this short time to luck. . . ." Christopher J. Gerber

"It took me about two hours." John Mosley

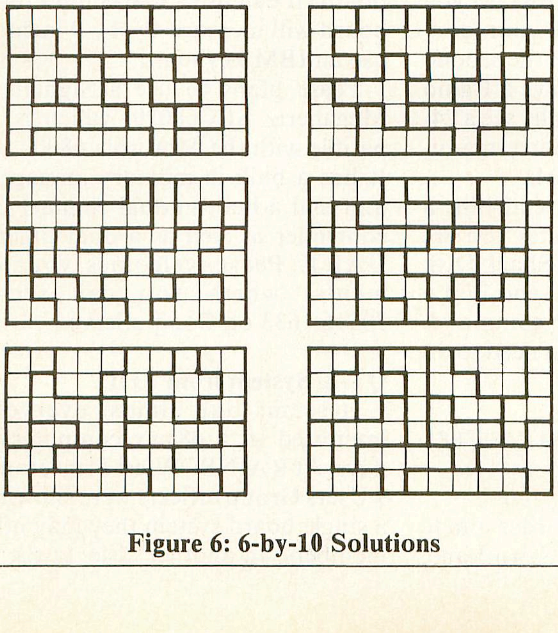

Figure 6: 6-by-10 Solutions

". . . this one has got me hooked. . . . I have promised myself to write a program that will solve this puzzle in all its variations. . . ." John Schott

". . . well it's six days later and I'm no further ahead. . . ." Joel F. Klein (went on to solve many puzzles)

Pentomino Answers

As it turns out, there are two answers to the 3-by-20 puzzle, except for rotations (turning the answer upside down) and reflections (observing the answer in the mirror). There are 1010 answers to the 4-by-15 and to the 5-by-12, and 2339 answers to the 6-by-10. Hard to believe, isn't it?

The two answers to the 3-by-20 are shown in Figure 3. Selected answers to the 4-by-15, 5-by-12 and 6-by-10 are shown in Figures 4, 5 and 6, respectively.

May I have the Printout, Please . . .

I picked up mail from my post office box on January 5, 1989, and found a notice for a certified letter from an Iowa ZIP, postmarked in December. Sure enough, this turned out to be the winning entry, with an astounding 1420 points. "I would like to have put the program on my computer but didn't have time to convert the program for my CoCo 2. Maybe Santa will bring me a CoCo 3 for Xmas. These were done by trial and error with paper and pencil. I like working puzzles. Regards, Dale Luense".

Dale receives fifty million microdollars ($M 50,000,000) — about $50 at current exchange rates at the Fort Worth Currency Exchange. The second- and third-place winners each receive a copy of my Radio Shack book *Shortwave Listening Guide* and a diskette containing the Hershey font character set and programs. The second- and third-place winners are:

Jason Cornez of Springfield, Ohio, with 290 points
Lee Walker of Richmond, Virginia, with 230 points

I assume here that the entries from Jeff Stall of Naperville, Illinois, were not to be counted. If I misunderstood, please let me know, Jeff.

Honorable mention (with significant work) in no special order:

Edd Hollingsworth, Marion, Indiana
A. Prosky. Pgh, Pennsylvania
Marc Chabot, Carignan, Quebec
Gregory Long, Walnut Creek, California
Hermann Lorenz, Burford, Ontario
Tim Cummings, Palmdale, California
Buel R. Thomasson, Poplar Bluff, Missouri
Brian Davidson, Idaho Falls, Idaho
James Posporelis, Troy, New York
George Aftamonow, Milford, Connecticut
Christopher Gerber, East Lyme, Connecticut
John Mosley, Portland, Connecticut
James J. Wright, Kennett Square, Pennsylvania
John Schott, Blakely, Pennsylvania
Joel F. Klein, Indianapolis, Indiana
Leroy Guse, Greenleaf, Wisconsin

Other entries either solved the 3-by-20 puzzle alone or one or two of the other configurations. I still appreciate the response, however, and hope you enjoyed the challenge.

And that's it for this month. Next month, more foolishness on the CoCo.

KISSable OS-9

Continued support for OS-9 users

In Quest Of New Technology

By Dale L. Puckett
Rainbow Contributing Editor

Moving into the second quarter of 1989, dedicated OS-9 hackers continue to carry the load. In fact, at this writing they appear to be the only group of people pushing the Color Computer OS-9 Community forward in its quest for new technology and techniques. This month we'll highlight some of the ideas they've been throwing around during the past several months. Hopefully, one of their ideas will help you solve a pressing problem.

First, how would you like to be able to turn on your computer and have it boot OS-9 for you automatically. You can now, thanks to the work of OS-9 Users Group Vice President Pete Lyall. Lyall created an OS-9 autoboot EPROM after hearing that many people at RAINBOWfest Princeton were interested in one.

Lyall's EPROM will boot OS-9 on power-up or following a cold reset. It takes you to Tandy's Disk BASIC if you press a key during the boot sequence. Lyall had already developed the EPROM for a few friends, but hadn't realized there was any general interest until he received the feedback from Chicago.

After RAINBOWfest, people on the CompuServe OS-9 SIG where Lyall is an assistant SysOp told him they were very interested in his EPROM. Many said they needed it to protect remote unattended OS-9 systems. Others wanted to make it easier for children and spouses to run OS-9 games and applications.

Lyall will program a 24-pin 68764/6 EPROM and send it to you for $31. The EPROM costs him $17, and he charges $10 to burn it. The rest goes toward shipping. He'll program a 28-pin 2764 EPROM and send it to you for only $18.

If you supply a blank EPROM, Lyall will program it and ship it back to you for $14. But you must make sure it is really blank. He recommends the 250-nanosecond versions for the 2764 EPROMs used in the J & M and Disto controllers.

If you're not sure which EPROM you need, you'll need to open your controller and count the pins on the second largest chip inside. If you have a Radio Shack controller, you'll usually see a 24-pin EPROM. Most third-party manufacturers use 28-pin EPROMs.

Lyall requires that you send him a signed statement that indicates you are a legitimate owner of Radio Shack Disk BASIC and prefers that you send him a copy made with your `SAVEM` command. Here's the command line you need to do the job.

```
SAVEM "DBASIC.BIN",&HC000, &HDFFF,
&HA027
```

Send a check or money order made payable to Pete Lyall, 1040 Stern Lane, Oxnard, CA 93035. If you have questions you can reach him on CompuServe at 76703,4230. On Delphi you can leave him a message to OS9UGVP.

Pease Designing 68K Computer

Another hard-charging OS-9 hacker is Kevin Pease. He's working on a single board design of a 68K computer. Pease's board will hold 2 megabytes of 256K-by-4 memory — eight megabytes if you use one-megabyte chips.

The board will support 3½-inch floppies and use direct memory access transfers. It will also have a SCSI interface for hard disk support. The hard disk will use DMA to obtain a maximum transfer rate of 1.6 Meg per second. Four serial ports and a video graphics interface supporting 256 colors and 640-by-240 dot resolution will be on board. It can use a CM-8 monitor. The board will measure 4½-by-9 inches and use an IBM keyboard.

Pease plans to use a Signetics 10-Megahertz SCC68070, which is compatible with the Motorola 68000 series. It has a built-in memory management unit and a built-in dual channel DMA controller as well as a dual timer and UART. Pease welcomes your comments, which you can send to 70516,1633 on CompuServe.

QT-K System from FHL

It seems like almost everyone is interested in a 68*xxx* computer these days. At RAINBOWfest Princeton, OS-9 Users Group officers were showing off a single board system they may offer to members. In another aisle, at the FHL

Dale L. Puckett, a freelance writer and programmer, serves as director-at-large of the OS-9 Users Group and is a member of the Computer Press Association. His username on Delphi is DALEP: on packet-radio, K0HYD @ N4QQ; on GEnie, D.PUCKETT2; and on CIS, 71446,736.

booth, Frank Hogg was asking for your ideas for the latest addition to his QT line. *His* newest computer is a bus-based system that gives you a way to expand your computer.

This is a major change in approach since most of the earlier 68*xxx* computers have been single-board systems. Hogg showed a basic five-board system at Princeton, after recognizing the need for a low-cost 68*xxx* system that owners can customize and expand to suit their needs.

With Hogg's new entry, you can start with a floppy-based 68000 system with minimal memory and expand to a DMA SCSI hard disk system containing 16 megabytes of memory and a 68020 or 68030 or later. His K-BUS has 12 slots, a 16-megahertz zero wait state bus, a PC-style power supply and three DMA modes. The price of a basic 68000 system with 256K of memory is $649.95. The cost with OS-9 68K goes up to $999.95.

Options include a wire-wrap board for $59.95, a SCSI board for $149, a timer card with 6840 and Epson Seiko clock and battery backup for $129, a two-megabyte Dynamic memory card using one megabyte chips for $99 and a DMA board for $199.

A 68020 CPU card can be purchased for $599. A 68030 will cost you $799. The optional math coprocessor costs $99. Other boards being considered include an analog-to-digital and digital-to-analog interface, a MIDI interface for music, several graphics boards, an IEEE488 bus adapter and a PC bus adapter.

The FHL software side became the exclusive distributor of all OS-9 versions of *Sculptor* on January 1. The license was issued by *Sculptor's* London, England-based developers following several years that saw FHL sell more copies of the fourth-generation database program than any other distributor in the United States. Hogg said he sold 60 copies of *Sculptor* for IBM systems to people who own CoCo OS-9 *Sculptor*.

In early January, Hogg was preparing to give away disks containing the runtime package for *Sculptor* Version 1.14 and three or four useful programs. He planned to include a menu that can be used to drive any OS-9 based computer.

Having a copy of the *Sculptor* runtime package is similar to having a copy of BASIC09's runtime package, *RunB*. If you have *RunB*, you can run any packed BASIC09 program. Many program authors sell their programs in this form. Likewise, if you have a copy of the *Sculptor* runtime package, you can run any *Sculptor* program written by a third party. It looks like Frank has come up with a tremendous idea. We'll have more details about how you can get a disk or where you can download the runtime package and utility programs when they become available.

Hogg would like to hear your comments about his bus. Write him at 770 James St., Syracuse NY 13205.

A Call for True DMA

Paul B. Pollock, PAULBELL on Delphi, is also looking for your ideas. We had a long conversation with him at RAINBOWfest Chicago last year and the day after Christmas we received a lengthy description of a new approach to CoCo OS-9 disk access. If you're interested in this subject or would like to help convince a hardware designer to tackle the project, please contact Paul at 8330 Haskell Ave., Sepulveda, CA 91343. You can also contact him on Delphi or on his own "Hound and Lion BBS" at 818-895-1016.

Pollock's note offered a detailed comparison of true direct memory access and the track/sector reading with interrupt processing methods that is used on the current crop of OS-9 disk controllers. The newer controllers are a definite step in the right direction, but Pollock feels we need to do better. While the current approach yields a 100 percent improvement over the original controllers, he believes that communications software, multi-drive access and process descriptor service routines handling inter-window communications all slow down the system and reduce the improvement to a point far below 100 percent.

Pollock is proposing a slave processor that operates with "dead clock" access to the bus in a manner similar to that used by the Color Computer 3's GIME chip. He's calling for a "piggyback" card that will hold the 6809E and bring out the BA and BS lines from the system bus. He believes the "slave" processor must be a true CPU and suggests a Motorola MC68008. The 68008 could do "smart" file transfers, disk formatting, disk backup and file copying with no help from the host Color Computer.

There are many software considerations that must be addressed during the design phase of a project like this. It was an extremely interesting letter that ended with Pollock's prediction that a controller using this approach could be built for about the same price of the current crop of "no halt" controllers. Indeed, I've wondered for a long time why a third-party hardware designer doesn't come up with a slave processor to handle all the OS-9 graphics functions while the main 6809E does the computing. With CoCo's 6809E and two or three slave processors, OS-9 could really soar!

OS9: SOFTWARE <D_P_Johnson >my_system >>no_errors #512K &

LEVEL 1 OS-9 ONLY

SDISK - Standard disk driver module replacement allows full use of 40 or 80 track double sided drives with OS-9 Level I. Full compatibility with CoCo 35 track format and access all other OS-9 non-CoCo formats. Easy installation. **$29.95**

SDISK+BOOTFIX - As above plus boot directly from a double sided diskette.**$35.95**

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SDISK3 - Level II version of SDISK driver. Same features as level I (except bootfix not required to boot from double sided). **$29.95**

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L2 UTILITY PAK Level 2 Ram Disk and Printerr driver plus 10 more **$39.95** **BOTH L1+L2** Paks for **$75.00**

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SEND S.A.S.E FOR LATEST CATALOG

All diskettes are in CoCo OS-9 format unless otherwise requested; other OS-9 formats can be supplied for $2.00 additional charge. All orders must be prepaid or COD, VISA/MC accepted, add $2 S&H for first software item, + .50 for each additional item, additional charge for COD.

D. P. Johnson, 7655 S.W. Cedarcrest St.
Portland, OR 97223 (503) 244-8152

(You may best reach us between 9AM-NOON Pacific Time, Mon.-Fri.)

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Submitting Material To Rainbow

Contributions to THE RAINBOW are welcome from everyone. We like to run a variety of programs that are useful/helpful/fun for other CoCo owners.

WHAT TO WRITE: We are interested in what you may wish to tell our readers. We accept for consideration anything that is well-written and has a practical application for the Tandy Color Computer. If it interests you, it will probably interest lots of others. However, we vastly prefer articles with accompanying programs which can be entered and run. The more unique the idea, the more the appeal. We have a continuing need for short articles with short listings. These are especially appealing to our many beginners.

FORMAT: Program submissions must be on tape or disk, and it is best to make several saves, at least one of them in ASCII format. We're sorry, but we do not have time to key in programs and debug our typing errors. All programs should be supported by some editorial commentary explaining how the program works. We also prefer that editorial copy be included on the tape or disk using any of the word processors currently available for the Color Computer. Also, please include a double-spaced printout of your editorial material and program listing. Do not send text in all capital letters; use upper- and lowercase.

COMPENSATION: We do pay for submissions, based on a number of criteria. Those wishing remuneration should *so state* when making submissions.

For the benefit of those who wish more detailed information on making submissions, please send a self-addressed, stamped envelope (SASE) to: Submission Guidelines, THE RAINBOW, The Falsoft Building, P.O. Box 385, Prospect, KY 40059. We will send you comprehensive guidelines.

Please do not submit material currently submitted to another publication.

What do you think? If you would like to pursue a project of this nature or encourage someone else, contact Pollock via Delphi or U.S. mail.

OS-9 Virus Reported

OS-9 hackers are scratching their heads and wondering how to prevent the spread of a computer virus on OS-9 systems after hearing that someone in Oregon uploaded an infected copy of a `Dmode` utility to a bulletin board there. One safeguard against these viruses may be the module checksum. Any change to a module will almost certainly change its checksum, even if its size is unchanged.

The modified `Dmode` reportedly claimed to add the ability to change a disk's interleave without destroying any data. A curious user downloaded it and soon realized it contained a surprise. Two days later, he learned a virus had already infected his computer.

The reported virus allegedly attached itself to the `CC3Disk` module in memory and replicated itself by adding `CC3Disk` to an `OS9Boot` file on any drive. It reportedly has a trigger that causes it to wreck your system after you have made 60 disk accesses. It reportedly will also attack your RAM and hard disk drives.

Mike Stute, GRIDBUG on Delphi, who first reported the virus, said the infected file was uploaded to a local BBS by a John Alan Basgill. When he and the BBS SysOp tried to call him they reached a grocery store in Portland, Oregon.

Why Not *PAK* It?

I received a note via amateur packet radio recently from a ham operator who was working temporarily at the U. S. Naval Academy in Annapolis, Maryland. He had downloaded an OS-9 program from UseNet but it had been compressed in the PAK format, so I offered to jump online and pull down a copy of G. B. Janssen's OS-9 archive utility. *PAK* is available on CompuServe, Delphi and GEnie. You may want to download it and take a look.

PAK does the same job as the *AR* utility found in the OS-9 User Group Library and the three major online services. It may, however, offer a few advantages. *PAK*'s main advantage is the fact that in many cases it compresses binary as well as text data. This could save you a lot of space if you are transferring a lot of picture or sound files. *AR*, on the other hand, compresses only text files.

PAK uses Huffman squeezing, run-length character compression and Lempel-Zev compression to do the job. It was developed on a CoCo OS-9 Level II system with the Tandy C compiler. It runs on both Level I and Level II systems.

Here's an example of *PAK*'s effectiveness. A *Color Max* file available on Delphi was 21,248 bytes long in its original form. *PAK*'s output from the same file was only 10,575 bytes long — a 50 percent savings in disk storage and communications line charges.

Like *AR*, *PAK* is very handy for distributing multiple binary, picture, text, sound and source files since it can group them into one file and eliminate the need for multiple transfers. It also solves the often-discussed problem of needing special protocols to eliminate characters added by Xmodem.

S/S Pak Can Talk With Level II

If you own a Tandy Speech/Sound Pak, you may want to fire it up under OS-9 Level II on your Color Computer 3. When I first got my CoCo 3, I was very disappointed that my Speech/Sound Pak was no longer usable. But today, thanks to Bruce Isted, Bill Boogaart and Mario Dilallo, my CoCo 3 can now use the Speech/Sound Pak.

Isted released a program to the public domain a long time ago that lets you use the Speech Pak with both OS-9 Level I on the CoCo 1 and CoCo 2 or OS-9 Level II on the CoCo 3. He also helped Boogaart and Dilallo come up with the hardware mods. Since we've never seen this mod mentioned outside the national data libraries, we thought we should pass along some of the information here. If you would like complete details, download the file `SSPAK.AR` from the DL-10 library on CompuServe's OS-9 SIG.

`SSPAK.AR` contains a text file that gives you a step-by-step guide to modify your Speech/Sound Pak along with a new S/S Pak driver and S/S Pak descriptor that works with either OS-9 Level I or Level II. The modifications are needed because the Pak was designed to work with the CoCo 1 and CoCo 2 running OS-9 Level I, which runs at a .89-megahertz clock rate. On the other hand, OS-9 Level II on the Color Computer 3 uses a 1.78-megahertz clock. To make the Speech/Sound Pak work with OS-9 Level II then, you must modify it so it can handle a clock rate of 1.78 megahertz.

You must also change a transistor because the higher clock rate of the CoCo 3 causes the input signal from the bus E clock to drop to approximately -2.5 volts. The original 2N2907 transistor needs at least -5 volts to work properly. Isted's mod substitutes a 2N3906 in its place.

There is one more hitch. Before you can begin, you must determine which model of Speech/Sound Pak you own. Two different models, the 26-3144 and the 26-3144A, have been reported on the market. The first appears to have a Radio Shack label. The latter has a Tandy label.

You'll find a 2N2907 serving as a voltage inverter alongside an inductor in an axial package in the 26-3144. If you have the 26-3144A, you'll see a different transistor near an inductor in a small plastic box. In both models, you'll find the transistor and coil near the post hole in the circuit board.

The 2N2907 in the 26-3144 model Pak has the same pinout as the replacement 2N3906, a PNP transistor. On the other hand, you must reverse the Base and Collector leads of the 2N3906 when you replace the transistor in the 26-34144A model Pak. The transistor in this pak has a pinout of Emitter, Collector, Base when viewed in the same manner as the 2N3906.

To fix the low-voltage problem you must replace the 2N2907 in the model 26-3144 Pak or the anonymous transistor in the model 26-3144A Pak with a 2N3906. If you have the latter model, don't forget to reverse the leads of the Base and Collector.

The other half of the Speech/Sound Pak modification concerns itself with the clock rate used by the speech synthesizer. To change it you first cut the trace connected to Pin 9 of the 74LS86 chip. After you cut this trace, ground Pin 9 of the chip. Your Speech/Sound Pak will now work properly at 1.78 megahertz. If you want to be able to use the Pak in your CoCo 1 at .89 megahertz, you can install a single-pole, double-throw switch to turn your modification on and off.

Speech synthesizers encourage me to experiment and have fun. I hope you'll try these mods and enjoy the results.

CoCo OS-9 Joins Packet Radio and the National Weather Service to Track Oklahoma Tornados

For several years J. Frank Fields, who has been very active in the OS-9 User Group, and fellow amateur radio operators have worked with the National Weather Service to track thunderstorms and tornadoes across Oklahoma. Working with Dr. Kenneth Crawford, Gary Skaggs and Larry Mooney from the Oklahoma City Weather Office at Will Rogers Airport, Fields helped develop a packet radio network that delivers late-breaking weather information from Oklahoma City to civil defense offices across the state. Because of the low cost of the Color Computer, many of the civil defense offices are using it to receive information from the amateur radio packet network.

Now Fields is striving to push the edge of CoCo OS-9 technology forward again. His network is expanding and will soon have several 223-megahertz nodes transferring messages at 19,200 baud. He hopes to drive this network with a protocol known as TCP/IP. Operating on this network, which is used by the defense department as well as many government agencies and universities, is like owning an automatic bulletin board.

With a standard bulletin board system, like the Color Computer BBS systems in local communities (or the large national databases like Delphi, CompuServe and GEnie), you must go to the library and get the information you want. With a TCP/IP network, the information comes to you automatically. For example, as long as I leave my amateur radio station on the air, I will automatically receive any mail sent to my unique TCP/IP address. This mail could have been routed via amateur radio, been shot across the country via a satellite or transferred through a standard telephone modem. My station doesn't care, it just automatically records the mail for me when it arrives. It's a fascinating concept and Fields is pushing hard to make the CoCo OS-9 community part of the action.

We introduced him to another amateur radio operator in New Jersey who is working hard to port Phil Karn's C implementation of TCP/IP to CoCo OS-9. We also put him back in touch with George Dorner, OS-9 User Group Treasurer, who belongs to a Chicago group that is charging forward on the same frontier. These guys are onto something big.

By the way, Fields reports that the National Severe Storms Laboratory team in Oklahoma owns a chase van that carries a lot of exotic electronic equipment, including a device called "Toto." They drive the van as close as possible to the path of a developing tornado. A radio in the van sends back a signal generated by NEXRAD, a Next-Generation Doppler Radar, to any packet radio station within 50 miles. In the past, pay telephones were then used to relay the latest radar data to help guide the placement of Toto. Now, thanks to Fields and other CoCo and amateur radio buffs, it can be relayed to anywhere, from anywhere, in the state — even while the van is moving. Fascinating!

Window Writer Update

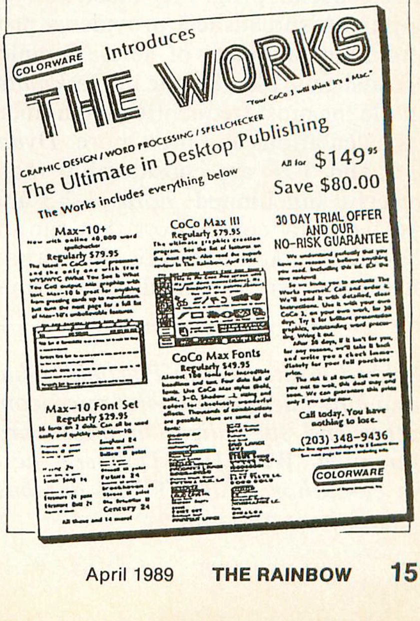
We talked to Tom Roginski at Owl-Ware just before we hit the deadline for this column and learned that *Window Writer*, the Microsoft *Word* line word processor for Color Computer OS-9, is very close to shipping. Tom and his technical assistant, Bruce Navarre, were putting the final beta version through its paces when we called (early January). He hoped to be ready to advertise it in this issue of RAINBOW. If he doesn't make the advertising deadline, you're sure to hear about it in the May issue.

Roginski reported that *Window Writer* author Roger Dash, a student at the University of Illinois, had taken our earlier comments to heart and had firmed up the editor's user interface to bring it closer to the standards established by programs like Microsoft *Word*. He said *Window Writer* and the IBM-like keyboard sold by Owl-Ware now have a perfect marriage.

With this look back to the future we must end this month's column. The "find file" project is still cooking and we hope to take a close personal look at *Window Writer* in May.

Keep on hacking!

Real Desktop Publishing with THE WORKS. See page 19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COLORWARE

Data Processing With BASIC09

By Richard A. White
Rainbow Contributing Editor

When OS-9 first appeared for the CoCo, one question many asked was, "Now that I have it running, what do I do with it?" A variant of that question can be asked about any computer. In the early 1980's, we had to write programs ourselves using BASIC to get many things done. The appearance of word processors, spreadsheets and file programs simplified things considerably so that most common tasks can be done with easily obtained software.

However, some applications do not lend themselves to easy solutions in standard application software. For these, special programs must still be written. A spreadsheet provides a programming language of sorts. Simpler spreadsheets, like the one in *Deskmate*, handle the most frequently used numerical calculations and little more. *DynaCalc* and *VIP* are considerably more powerful but limited. *Lotus 1-2-3* and now its many competitors that run on MS-DOS machines like the Tandy 1000s have very powerful *macro* capabilities built in. These are really programming languages that allow the user to do most of what can be done in conventional programming languages.

The most powerful database manager programs, like *dBASE*, *RBASE*, *FoxBASE* and others on MS-DOS machines and *Sculptor* under OS-9, have extensive built-in programming capabilities. In fact, most new business data applications written today are done, at least in part, using a database manager.

The home user may not wish to invest in a full-featured database manager program since there are the options of using Disk BASIC or BASIC09. Of the two, BASIC09 is by far easier to work with, faster and more powerful. I routinely use two applications that I wrote using BASIC09. One keeps records of rank, skill awards and merit badges for a Scout Troop. This requires nearly 150 fields per record. That is beyond the reasonable capabilities of all CoCo database programs that I own, with the exception of *Sculptor*. One or two other OS-9 based database managers that I am unfamiliar with may do the job.

The other program is a survey analysis program, which I will discuss here and in next month's column. I became involved in writing survey analysis programs five years ago when Professor Sam Sherrill of the University of Cincinnati asked my help with a project. He had been retained to devise and administer a survey of about 50 questions to less than 200 people. The survey was somewhat complex, and Sherrill believed he could analyze the results of the data using his CoCo. We programmed the project using Disk BASIC and the results were sufficient, producing better results faster and with less manual calculation than typically required. We subsequently programmed a number of other surveys with the CoCo and ported the software to an IBM PC.

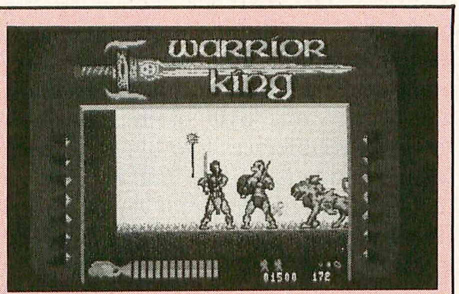
The surveys are not major by any means. They benefit local social service agencies that need information about their services and clients, but who are neither knowledgeable in survey method or microcomputers. Small surveys of this nature are valuable to groups such as churches, schools and computer user groups. The survey application we will discuss deals with model railroading.

For over twenty years, the Cincinnati division of the National Model Railroad Association has sponsored an annual public show in November. The objective of these shows is to promote the hobby and provide a major revenue source for the sponsor. Attendance is over 5000 and production costs are approaching $10,000 per year. To publicize the show effectively, there was a need for a pool of information about the people who attend.

Richard White lives in Fairfield, Ohio, has a long background with microcomputers and specializes in BASIC programming. With Don Dollberg, he is the co-author of the TIMS *database management program.*

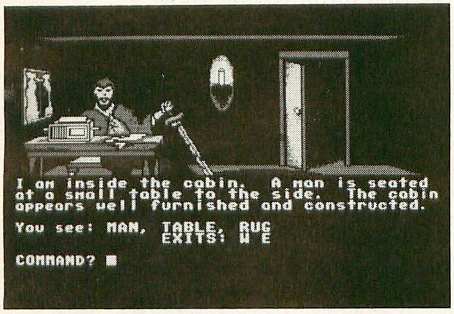
SUNDOG SYSTEMS

Warrior King



Become RASTANN, Warrior King, on the quest to regain his rightful crown, hidden deep within a sinister land. Battle monsters, gain magic and weapons, and travel through harsh wilderness and dark castle dungeons in this medieval realm. From the creator of *Kung-Fu Dude* comes this awesome arcade game for the CoCo III! *Warrior King* uses the most detailed 320x200 16 color graphics and high speed machine code to vault you into a world of fantasy. Dare ye challenge the many perils ahead in order to become WARRIOR KING? Req. 128K CoCo III, disk drive, and joystick. Only $29.95.

In Quest of the Star★Lord



```
I am inside the cabin.  A man is seated
at a small table to the side.  The cabin
appears well furnished and constructed.

You see: MAN, TABLE, RUG
          EXITS: W E

COMMAND? ■
```

This is THE graphic adventure for the CoCo III! Unparalleled 320x200 animated graphics will leave you gasping for more! You quest for the Phoenix Crossbow in this post-holocaust world of science and fantasy. *In Quest of the Star Lord* is a full 4 disk sides of mind-numbing adventure! Req. 128K CoCo III and disk drive. Only $34.95. Hint Sheet: $3.95.

"A dynamite program! The best graphics I've seen to date on the CoCo III. You have to see it to believe it."

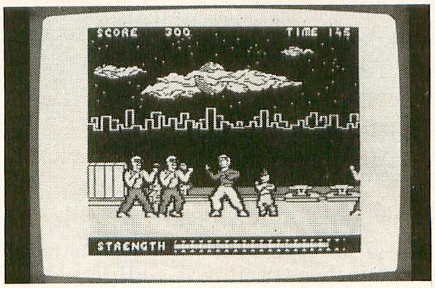
— 8/88 Rainbow review

Kung-Fu Dude

An exciting arcade game. The BEST karate game ever created for the CoCo! Destroy opponents and evade obstacles as you grow ever closer to your ultimate objective. Spectacular graphics, sound effects, and animation! Req. 64K CoCo, disk drive, and joystick. Only $24.95.

"The CoCo karate gap has been filled and Kung-Fu Dude *does it excellently. I highly recommend it!"*

— 2/88 Rainbow review



All programs CoCo 1, 2, 3 compatible, unless otherwise stated

HALL of the KING TRILOGY

The epic adventure is back! The largest adventure campaign ever seen for the CoCo is again available! A total of six disks of intense graphic adventure will have you playing for weeks! Each section is a two-disk stand alone adventure, but all three together form an epic saga. Quest for the legendary Earthstone in the ancient dwelling of the dwarves while you enjoy the classic graphics that made this trilogy famous! Each adventure can be purchased separately for $29.95, the lowest price ever, or you can purchase the entire set for only $74.95! Req. 64K CoCo and disk drive.

"One of the best adventures I have experienced to date!" *— 6/86 Rainbow review*

"The animated graphics are dramatic, detailed, and excellent!" *—11/87 Rainbow review*

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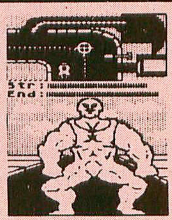

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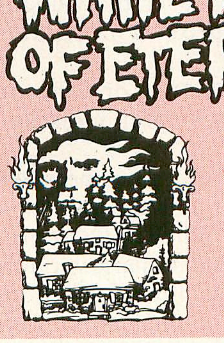

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A few years ago, the committee distributed surveys to attendees, resulting in 3000 forms. To analyze the results using a computer, we don't need to enter data from every form. This is the whole basis of the polling theory. Answers applicable to an entire population can be obtained from a small group as long as those responding are representative of the principal groups making up the whole population.

My plan was to write a program to input and analyze data from the forms. Sherrill recommended using only 10 percent of the forms for sufficient data. It is important to select them uniformly throughout the bag — say every tenth form.

Next we defined the data's structure. Each survey response form constituted a record, with each piece of data classified to a particular field in the record. Because it is difficult to analyze essay-type answers, we chose multiple choice questions as follows:

1. Please tell us how your heard about this year's show. Check as many as apply.

_city newspaper
_flyer at hobby shop
_suburban paper
_radio
_television
flyer at______
friends______
other______

2. Which best describes your interest in model railroading?

_active;
_inactive
_inactive, but interested
_no real interest.

When the survey forms are in and a sample selected, it is time to put the computer to work. A record is set up in the program for each form. Individually stored responses provide maximum analysis flexibility.

Familiarity with BASIC09 or access to reference material is helpful in discussing this program.

One principal difference between conventional BASIC and BASIC09 is in handling variables. While BASIC09 provides simple string and numeric variable defaults, the user has powerful options to tailor variables for memory conservation, execution speed, disk file speed and space conservation, and for program readability and maintainance. This is done by dimensioning variables at the very beginning of the program module.

The `DIM` statement tells BASIC09 the type of variable and how much memory to reserve for that variable. There are five predefined variable types in BASIC09; `BYTE`, `INTEGER`, `REAL`, `STRING` and `BOOLEAN`. Byte, integer and real variables handle numbers. A byte variable stores a whole number between 0 and 255 in one byte of memory. An integer variable uses two bytes to store whole numbers in the range between -32,768 and 32,767. A real variable uses five bytes to store a floating point number that can be in the range ± 1*10^±38. Like the numeric variable used in Color BASIC, this type supports decimal numbers. Our program only uses byte and integer variables, which are dimensioned as follows:

```
DIM count1,count2,count3,path:INT
EGER
DIM row:INTEGER
DIM flag:BYTE
```

Note that long variable names work and are encouraged for program readability and later maintainance. If you pack the procedure, variable names are stripped out, saving memory. A number of variable names can be strung together with comma separators to save typing.

The string variable type stores characters. Its length is fixed by the number provided in its `DIM` statement, or at a default 32 characters. The statement `DIM filename:STRING[16]` allocates 16 bytes for the name of the string that will hold the name of the file in which the program will store data. Here is where BASIC09 follows the more conventional compiled languages like FORTRAN, Pascal and C; 16 bytes only are set aside for the string. If you try to assign a longer string to the variable, its excess over 16 bytes is lost. Here are examples of dimensioning string variables from our program:

```
DIM answer:STRING[1]
DIM filename:STRING[16]
```

No decimal numbers are used in the program, but if there were, a dimension statement would look like this:

```
DIM floating:REAL
```

I seldom use the boolean type, but it is dimensioned in a similar way to the examples already shown.

Arrays allow you to group a number of pieces of data under one variable name and to access each data item by its number in the array. As each survey form is entered into the computer, it is numbered. That number refers to the member of the data array that contains the raw data entered. The simplest example from the survey program is the ZIP code array shown here:

```
DIM zip(500):STRING[5]
```

Since I will use the ZIP code data to determine where show attendees live: in town, out of town, which side of town etc.. Only five digits are needed. ZIP codes in my area are in the 4*xxxx* series, 41*xxx* for Northern Kentucky, 43*xxx* to 45*xxx* for Southwestern Ohio and 47*xxx* for Eastern Indiana. So I cannot use the integer type. Since I only need to sort and compare the ZIP code values, a five-character string will work well. The 500 in parentheses right after the variable name `zip` tells BASIC09 to reserve memory for 500 entries. BASIC09 then reserves a 2500 byte block (5 * 500) of memory for the array. It finds which five bytes it needs to deal with by a simple calculation of byte count into the 2500-byte data block. Here is an example of another string array:

```
DIM c(13):STRING[20].
```

Arrays can be of any variable type, including complex, user-defined types.

Complex variables contribute much to the power of BASOC09 in dealing with data handling chores like compiling survey data. The `TYPE` statement communicates to BASIC09 a user-defined variable type that is a collection of variables of possibly mixed basic types. Here is a look at the type statement used in the survey program:

```
TYPE dat=ar,cnews,snews,radio,
tv,hfly,efly,fr,oth,act,iai,ia,
ni:BYTE
```

Following the `TYPE` keyword is the type name data I assigned. The = is followed by names of the variables in the statement. The `TYPE` statement is fairly simple, containing only byte-type variables. You can mix all basic variable types in a `TYPE` statement. At this point, BASIC09 treats the `TYPE` statement as information only. We still need to dimension a variable using the new variable type. Here's an example:

```
DIM rec(500):dat
```

Here a variable array named `rec` has been dimensioned using our new type `dat`. Each member of the rec array contains all the variables defined in the type statement for `dat`. Since there are 12 byte-type variables, the `DIM` statement will allocate 6000 (500 * 12) bytes for the array. This stores data as economically as possible without tweaking individual bits. Bit manipulations are possible but are considerably more complex.

That constitutes all the variables used in the program. They are all dimensioned up front so BASIC09 can assign needed memory immediately and so we can easily find the `DIM` and `TYPE` statements if we need to change something.

Next, it is good practice to initialize variables. Most BASICs automatically initialize variables when they are dimensioned or first used. BASIC09 does not. All it does is allocate memory space. What is in the variable is what was in those bytes beforehand. This can be of harm in a number of ways not always apparent from an error message.

It will contain some number, depending what the bytes in its assigned memory area were used for before you ran the program. This may not cause an error, but your results will be wrong. A string variable will contain garbage that also may or may not cause an error. Here is the initialization section of our survey program:

```
(* Initialization *)
c(1)="CITY NEWSPAPER"
c(2)="SUBURBAN NEWSPAPER"
c(3)="RADIO"
c(4)="TELEVISION"
c(5)="HOBBY SHOP FLYER"
c(6)="FLYER ELSEWHERE"
c(7)="FRIENDS"
c(8)="OTHER"
c(9)=" "
c(10)="ACTIVE"
c(11)="INACTIVE, INTERESTED"
c(12)="INACTIVE"
c(13)="NO INTEREST"
rec(1).ar=0
rec(1).cnews=0
rec(1).snews=0
rec(1).radio=0
rec(1).tv=0
rec(1).hfly=0
rec(1).efly=0
rec(1).fr=0
rec(1).oth=0
rec(1).act=0
rec(1).iai=0
rec(1).ia=0
rec(1).ni=0
zip(1)=""
```

This is a good example of how to access individual members of an array (`eg. c(5) =`). Note how the variables in our user-defined type `dat` are accessed (`- rec().cnews`). The period connects the subvariable `cnews` to the dimensioned variable name `rec`. Note also that I initialized only the first member of the `rec` array. We will use that initialized member to initialize the other array members if we need to start a new file. If an existing file is used, that file will have been initialized when it was first created; loading it into the computer will fully initialize the array in memory.

If no data file exists, BASIC09 will not create one when you try to open the file as many BASICs will. Rather, you must use the `CREATE` statement to start the file. I generally have the program ask if a new file is to be started, though the `ON ERROR GOTO` command can be made to do it automatically in a round-about way. If I were writing a program for others, I would probably automate the operation in some cases. But I don't like to deal with the complexity when writing for my own use. In any case, following is the code to determine if a new file is to be made or an existing one loaded. I will present it piece by piece with comments on code pieces along the way.

```
(* Existing File or Initialize *)
PRINT CHR$(12)
RUN printat(10,10)
PRINT "I Initialize Array"
PRINT
PRINT TAB(11); "L Load Array"
RUN printat(10,14)
```

BASIC09 does not contain a `CLS` command to clear the screen, but `PRINT CHR$(12)` does the same thing.

Printat is a separate small program to position the cursor on the screen. It is called by name using the `RUN` command. It needs two parameters: the column and the row where the cursor is to be placed. These are included in that order within the parentheses. These could be variable names rather than numbers. Here is the module in its entirety:

```
PROCEDURE printat
0000     PARAM col,row:INTEGER
000B     PRINT CHR$(2); CHR$(col32);
         CHR$(row32);
0021     END
```

In the `Printat` procedure, the `PARAM`

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keyword is used instead of `DIM` to indicate that values for the variables `col` and `row` will be sent when the procedure is called. In our example these were just numbers. If they had been in variables in the calling program, `Printat` would have been given addresses in the data space where those variable values were being stored. No new variable storage space would be involved in this case.

If I wanted to put some functions that work on values in our `rec` array in a separate procedure called `special_work`, I could let that procedure access the whole array with the simple call `RUN special_work (rec)`. The complete `TYPE` statement would need to be duplicated in the called procedure, but instead of `DIM rec(500):dat`, the statement `PARAM rec(500):dat` would be used.

The question of whether the user wants to start a new file (`Initialize array`) or load an existing file was asked. Here is how the answer (an I or L keyboard response) is handled:

```
WHILE answer"I" AND answer"L" DO
GET #0,answer
RUN isupper(answer)
ENDWHILE
```

First we only want to move on if an I or an L is keyed. The `WHILE. . . DO. . .ENDWHILE` makes this test and loops back if it is not met. You will like `GET #0, answer`. Note above that `answer` is dimensioned as a one-character-long string. `GET #0, answer` then goes to Path 0 to get one character and waits until that condition is met or until a carriage return is found. Path 0 is the keyboard so the `GET` statement waits until the user presses one key and then lets the program process the key. In this case `GET` is much nicer than `Inkey`, which lets the program go on whether there is a keystroke or not and where one must write a loop to keep looking at the keyboard.

If you have the keyboard in lowercase mode, you are not likely to remember that the program is looking for an uppercase response. The procedure `isupper` takes care of this by promoting all lowercase letters to uppercase. It also is relatively short, but long enough that one would not want to include it repeatedly in a program. I load it into BASIC09 whenever I am writing a program that will need it and call it as a separate named procedure. When you have a number of separate procedures in BASIC09 as you write a program, remember to save them all out into one file together with `SAVE*` *yourfilename*. Then when you reload the file all the procedures will load in together. Note also that `isupper` is set up to handle longer strings (40 characters as shown), but that it works for single characters as well.

```
PROCEDURE isupper
0000 DIM count,line_length:INTEGER
000B PARAM answer:STRING[40]
0017 DIM ascii:INTEGER
001E DIM char:STRING[1]
002A DIM work_string:STRING[40]
0036
0037 count:=1
003E line_length:=LEN(answer)
0047 work_string=""
004E
004F WHILE count<line_length+1 DO
005F ascii:=ASC(MID$(answer,
count,1))
006E IF ascii<96 THEN
007A char=CHR$(ascii)
0083 work string=work_string+char
008F count:=count+1
009A ELSE
009E char=CHR$(ascii-32)
00AA work string=work_string+char
00B6 count:=count+1
00C1 ENDIF
00C3 ENDWHILE
00C7
00C8 answer=work_string
00D0 END
```

If we need to make a new file, the following `if` statement is true and its contained code is executed.

```
IF answer="I" THEN
FOR count1=2 TO 500
rec(count1)=rec(1)
zip(count1)=""
NEXT count1
count1=0
RUN printat(10,14)
PRINT "FILENAME: ";
INPUT fname
CREATE #path,fname:WRITE
PUT #path,rec
PUT #path,zip
CLOSE #path
ENDIF
```

Remember that we initialized all variables in `member rec(1)` so all we need to do is assign `rec(1)` to all the other members of the array. We also initialized `zip(1)` to a `null`, `""`, but it is easier and more readable to repeat the null than `reference zip(1)`. The statement `count1=0` resets `count1` so I don't get a surprise later. The remaining code gets the new filename, creates the file, stores the arrays and closes the files. We will need the file again in the program, but I always assume a file is closed; then I open it, use it and close it to prevent surprises.

The `PUT #path,rec` and `PUT #path,zip` statements store both entire arrays, read individual variables or records to a file and then read them back in individually. This is also much faster since the computer needs to only dump 6000-byte and 2500-byte blocks of memory directly to the file. No time is wasted finding individual values. Recovery of the arrays is just as simple and fast. Here is the code block to load the arrays back into the program:

```
IF answer="L" THEN
RUN printat(10,14)
PRINT "Filename: ";
INPUT fname
OPEN #path,fname:READ
GET #path,rec
GET #path,zip
CLOSE #path
```

About the only thing different here from the code to save the arrays is the use of `GET` rather than `PUT`. We used `GET` before to get a character from the keyboard. Here we use it to get a whole array from a disk file. OS-9 was designed to be device-independent, and here we see one of the payoffs.

```
count1=0
REPEAT
count1=count1+1
PRINT count1; " ";
UNTIL rec(count1).ar=0
count1=count1-1
ENDIF
```

Since we need numbers to access array members, we need to have a count of how many have been used. One way is to save the count used into a variable in the file. That also saves memory and disk space. In the input section, I put the array member number into the variable `rec().ar`, so it is easy to hunt through this variable in the array members until I find a zero. `Count1` then is the member number of the first empty member. Since the input loop increments `count1` at its beginning, we need to subtract one so it represents the last used member at that point.

Next month we'll take up the data entry section and get into the data analysis.

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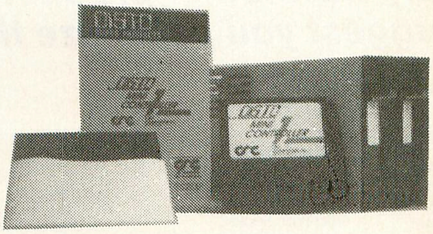

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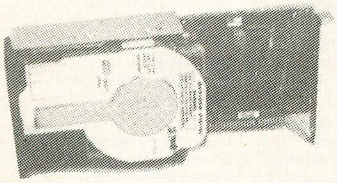

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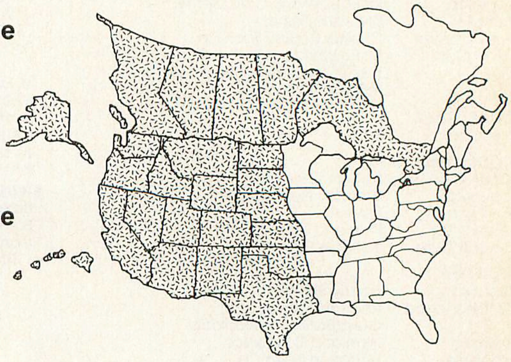

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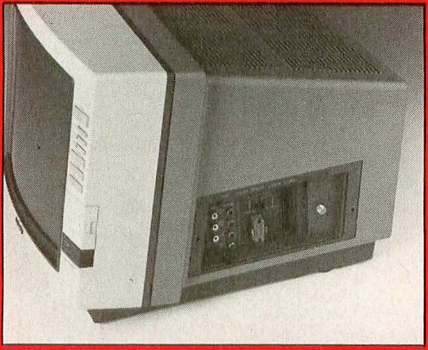

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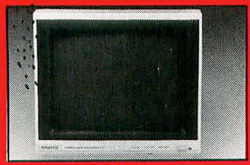

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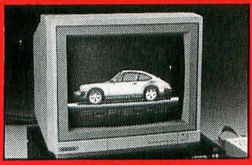

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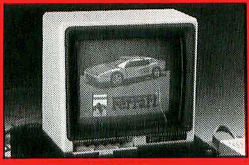

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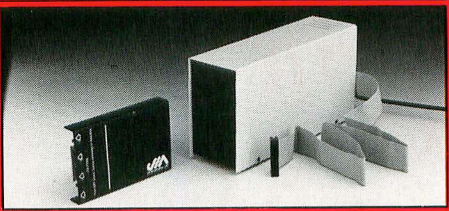

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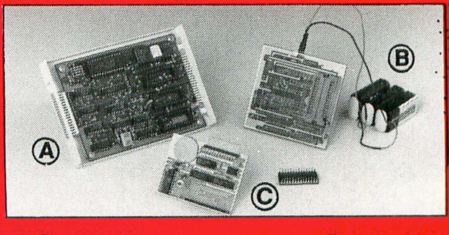
ADD-ON BOARDS

DC-3P Mini Eprom programmer includes all software to program 2764 or 27128 chips [B] **$55**

DC-3C Clock Calendar and parallel printer port [C] **$40**



RS-232 $49.95
Replaces R.S. RS-232 board. Plugs in drive port or multi pack. 2 MHz operation works with OS-9.($2 ship)

3 in 1 Board $59.45
Clock calendar at 2 MHz parallel printer port pack requires DISTO Controller or MEB($2 ship)

MEB $30 ($2 ship)
Plugs into multi pak to expand DISTO DC-3 bus. Use clock in DC-3 and eprom programmer in MEB.

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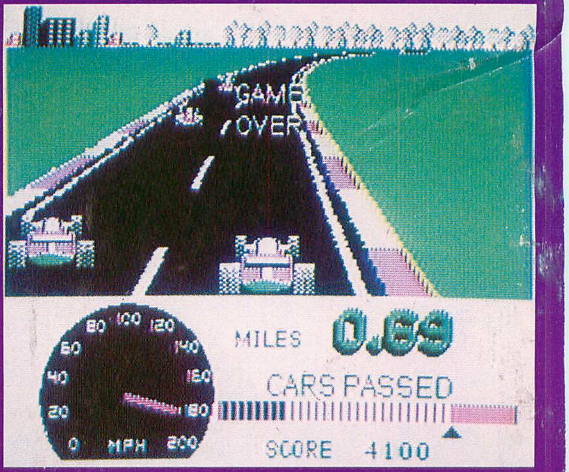
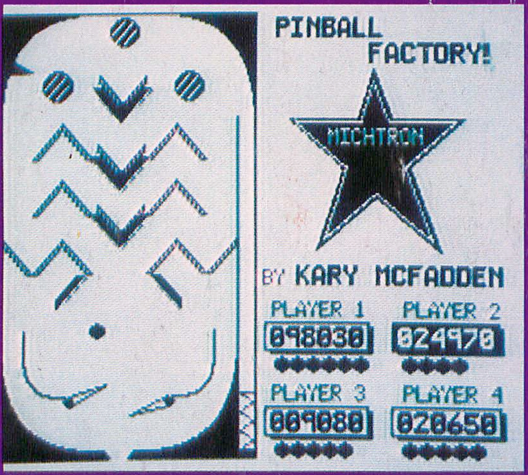
Speed Racer



As the checkered flag drops your pulse rises in this lively arcade game. The road twists to the horizon on the 3-D panorama that sets the stage for exciting racing. Vie for time as you glide through the curves at incredible speeds. Step through the gears to stay ahead of the pack, but be quick! Some will stop at nothing to see the end of the race, or the end of you! Four challenging raceways, complete with obstacles and colorful 3-D scenery test your skills in this Pole Position™ type game.

32K Color Computer required...$34.95

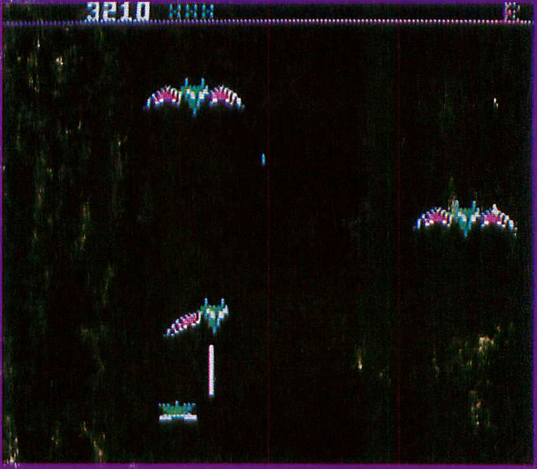


Pinball Factory

Video games come full circle in this tribute to the original arcade game, *Pinball*. Classic pinball springs to life as never before, with fresh new angles that only a computer can offer. Crisp graphics, sound, and fast smooth action give this machine-language arcade game a realistic, responsive feel you'll hardly believe. There are even "tilt" buttons that let you "bump" the machine. In addition to playing a great game of pinball, you can enjoy hours of creative pleasure as you design, build, edit, and play your own screens.

64K Color Computer required...$34.95

Demon Seed



The first waves of flying, diving, bloodthirsty bats are arriving. Move, fire, and move again. It's a never ending battle. If you are lucky enough to defeat the bats, be ready for a much greater challenge, The *Evil Demons* themselves. Destroy a wing and another takes its place. Only a direct hit can save you now. It will take great skill to triumph. If you do, then you better be ready for the *End*. The Demon Flag Ship descends to destroy your remaining ships. Your only hope is to penetrate the hull, break through the shield, and destroy the dreaded Gargoyle.

32K Color Computer required...$19.95

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